CCMTA|CCATM
Canadian Council of Motor Transport Administrators
Conseil canadien des administrateurs en transport motorisé

Technical Standard for Electronic Logging Devices

Proposed Canadian ELD Standard

following industry and stakeholder consultation

Prepared by: CCMTA ELD Working Group,
& Consultant Benoit Vincent, P. Eng.

March 2017
Updated May 2017

Introduction

In Canada, the National Safety Code (NSC) Standard for Commercial Vehicle Drivers Hours of Service (NSC Standard 9) requires drivers to fill out paper log books. The standard also allows the use of electronic media provided it captures the information required by the federal and provincial Hours of Service (HOS) regulations.

In September 2010, the Council of Deputy Ministers directed CCMTA to develop a technical, performance-based standard for Electronic On-Board Recorder (EOBR) use that would leverage the work completed by the U.S. and, if approved, would allow Canada to move forward with its own ELD requirement while ensuring compatibility with the U.S. (EOBR is the term formerly used for an ELD). In June 2011, an EOBR working group created under CCMTA engaged the PIT Group from FPInnovations to draft a Canadian EOBR standard, incorporating where appropriate key elements of the U.S. rule while allowing Canada the flexibility to consider its own unique regulatory and operational requirements.

In July 2013, CCMTA completed a draft version of the Canadian EOBR standard. That version of the Canadian Standard was the result of two years of consultations with provincial and territorial governments, industry stakeholders and ELD manufacturers. Comments and feedback received through the consultation process contributed to developing a standard that was well suited to motor carrier operations in Canada. Further to the subsequent issuance of the U.S. ELD final rule December 10, 2015, CCMTA re-engaged on the issue and an ELD working group, working with the PIT Group, updated the Canadian ELD standard to ensure consistency with the final U.S. ELD rule.

This report outlines the final version of the Canadian ELD technical standard following the consultation process completed in September 2016. Comments and feedback received from industry stakeholders and ELD manufacturers have contributed to the development of this final draft standard.

Canadian Council of Motor Transport Administrators
404 – 1111 Prince of Wales Drive
Ottawa, ON K2C 3T2
Phone: 613-736-1003
Fax: 613-736-1395
Email: info@ccmta.ca
Website: www.ccmta.ca

Approach and methodology

The approach was to use the functional requirements in the U.S. rule as a foundation and modify where necessary to Canada's own unique operational and regulatory requirements. This ELD technical standard is limited to the functionality of ELD technology and does not impose requirements on the driver or motor carrier; those requirements would be addressed in HOS regulatory amendments. It was developed to enable motor carriers and drivers to meet their regulatory obligations regarding Canadian HOS regulations. In addition, this standard allows enforcement officers and authorities to review and monitor regulatory compliance of motor carriers and drivers, whether on the road, at inspection stations or during facility audits.

In summary, the main objective for the Canadian ELD standard is to:

- Improve compliance for motor carriers and drivers required to maintain a logbook as per regulatory obligations under HOS regulations;

- Enable enforcement personnel to more efficiently verify compliance with HOS regulations.

As already indicated during the development process of the previous standard, the key elements for the Canadian ELD Standard are as follows:

- This is a technical standard tailored to requirements under current Canadian HOS regulations; it does not provide requirements over and above HOS provisions or necessarily include or require all features that can be offered by ELD manufacturers.

- This standard does not have to mirror the U.S. rule; however, it doesn't conflict with U.S. functional requirements for interoperability purposes. The Canadian approach was to ensure consistency and interoperability by adapting the U.S. ELD final rule to Canada's own unique operational and regulatory requirements.

- It is expected that the vast majority of ELD features and functionality will be driven by the U.S. ELD market. Further, ELD manufacturers will expect a positive return on investment to serve the Canadian market. As such, the Canadian ELD standard meets the minimum HOS regulatory and operational requirements for the majority of motor carriers that would use ELDs but is not necessarily tailored to all HOS regulatory provisions (i.e. exclusive of operations under permits [special exemption/ oil well service]).

- This standard is applicable to all Canadian jurisdictions (i.e. north and south of latitude 60).

- There is no requirement for cellular network communications. However, the ELD must be integrally synchronized with the engine of the Commercial Motor Vehicle (CMV) and include a location sensor (GPS).

Proposed Canadian ELD Standard

1   SCOPE AND DESCRIPTION

This Standard specifies the minimal requirements for an electronic logging device (ELD) necessary for an ELD provider to build a technology compliant with this Standard.

1.1   ELD Function

The ELD discussed in this Standard is an electronic module capable of recording the electronic records of duty status for CMV drivers using the unit in a driving environment within a CMV and meets the compliance requirements in this Standard.

1.2   System Users

Users of ELDs are:

a)   CMV drivers; and

b)   Support personnel who have been authorized by the motor carrier to:

   i.   Create, remove, and manage user accounts;

   ii.   Configure allowed ELD parameters; and

   iii.   Access, review, and manage drivers' ELD records on behalf of the motor carrier.

1.3   System Architecture

An ELD may be implemented as a stand-alone technology or within another electronic module. It may be installed in a CMV or may be implemented on a handheld unit that may be moved from vehicle to vehicle. The functional requirements are the same for all types of system architecture that may be used in implementing the ELD functionality.

1.4   System Design

a)   An ELD is integrally synchronized with the engine of the CMV such that driving time can be automatically recorded for the driver operating the CMV and using the ELD.

b)   An ELD allows for manual inputs from the driver and the motor carrier support personnel and automatically captures date and time, vehicle position, and vehicle operational parameters.

c)   An ELD records a driver's electronic RODS and other supporting events with the required data elements specified in this Standard and retains data to support the performance requirements specified in this Standard.

d)   An ELD generates a standard output file and transfers it to an authorized safety official upon request.

e)   This Standard specifies minimally required data elements that must be part of an event record such that a standard ELD output file can be produced by all compliant ELDs.

2   ABBREVIATIONS

CAN   Control Area Network
CCMTA   Canadian Council of Motor Transport Administrators
CMV   Commercial Motor Vehicle
ECM   Electronic Control Module
ELD   Electronic Logging Device
HOS   Hours of Service
RODS   Records of Duty Status
UCT   Coordinated Universal Time
USB   Universal Serial Bus

3   DEFINITIONS AND NOTATIONS

3.1   Definitions

3.1.1   Databus

A vehicle databus refers to an internal communications network that interconnects components inside a vehicle and facilitates exchange of data between subsystems typically using serial or control area network protocols.

3.1.2   ELD Event

An ELD event refers to a discrete instance in time when the ELD records data with the data elements specified in this Standard. The discrete ELD events relate to the driver's duty status and ELD's operational integrity. They are either triggered by input from the driver (driver's duty status changes, driver's login/logout activity, etc.) or triggered by the ELD's internal monitoring functions (ELD malfunction detection, data diagnostics detection, etc.). ELD events and required data elements for each type of ELD event are described in detail in section 4.5.1 of this Standard.

3.1.3   Exempt Driver

As specified in further detail in section 4.3.3.1.2 of this Standard, an ELD must allow a motor carrier to configure an ELD for a driver who may be exempt from the use of the ELD. An example of an exempt driver would be a driver operating under the short-haul exemption under current HOS regulations (within a radius of 160 km of the home terminal). Even though exempt drivers do not have to use an ELD, in operations when an ELD equipped CMV may be shared between exempt and non-exempt drivers, motor carriers can use this allowed configuration to avoid issues with unidentified driver data diagnostics errors.

3.1.4   Geo-Location

Geo-location is the conversion of a position measurement in latitude/longitude coordinates into a description of the distance and direction to a recognizable nearby location name. Geo-location information is used on an ELD's display or printout.

3.1.5 Ignition Power Cycle, Ignition Power On Cycle, Ignition Power Off Cycle

a) An ignition power cycle refers to the engine's power status changing from "on to off" or "off to on", typically with the driver controlling engine power status by switching the ignition key positions.

b) An ignition power on cycle refers to the engine power sequence changing from "off to on and then off". This refers to a continuous period when a CMV's engine is powered.

c) An ignition power off cycle refers to the engine power sequence changing from "on to off and then on". This refers to a continuous period when a CMV's engine is not powered.

3.1.6 Unidentified Driver

"Unidentified Driver" refers to the operation of a CMV featuring an ELD without an authenticated driver logging in the system. Functional specifications in this Standard require an ELD to automatically capture driving time under such conditions and attribute such records to the unique "Unidentified Driver account," as specified in section 4.1.5 of this Standard, until the motor carrier and the driver review the records and they are assigned to the true and correct owner.

3.1.7 Output file

"Output file" refers to an electronic document (pdf or any other format) being compliant with format and data elements specified in section 4.8.1.3. This output file is not required to be compliant with requirements specified in section 4.8.2.1.

3.2 Notations

Throughout this Standard the following notations are used when data elements are referenced.

a) < . > indicates a parameter an ELD must track. For example <ELD username> refers to the unique ELD username or identifier specified during the creation of an ELD account with the requirements set forth in section 7.18 of this Standard.

b) { . } indicates which of multiple values of a parameter is being referenced. For example <ELD username {for the co-driver}> refers specifically to the ELD username for the co-driver.

4 FUNCTIONAL REQUIREMENTS

4.1 ELD User Accounts

4.1.1 Account Types

An ELD must support a user account structure that separates drivers and motor carrier's support personnel (i.e. non-drivers).

4.1.2 Account creation

a) Each user of the ELD must have a valid active account on the ELD with a unique identifier assigned by the motor carrier.

b) Each driver account must require the entry of the driver's licence number and the jurisdiction that issued the driver's licence into the ELD during the account creation process. The driver account must securely store this information on the ELD.

c) An ELD must not allow creation of more than one driver account associated with a driver's licence for a given motor carrier.

d) A driver account must not have administrative rights to create new accounts on the ELD.

e) A support personnel account must not allow recording of ELD data for its account holder.

f) An ELD must reserve a unique driver account for recording events during non-authenticated operation of a CMV. This Standard will refer to this account as the "unidentified driver account."

4.1.3 Account Security

a) An ELD must provide secure access to data recorded and stored on the system by requiring user authentication during system login.

b) Driver accounts must only have access to data associated with that driver, protecting the authenticity and confidentiality of the collected information.

4.1.4 Account Management

a) An ELD must be capable of separately recording and retaining ELD data for each individual driver using the ELD.

b) An ELD must provide for and require concurrent authentication for team drivers.

c) If more than one ELD unit is used to record a driver's electronic records within a motor carrier's operation, the ELD the driver is operating most recently must be able to retrieve, retain and produce a complete ELD report for that driver, on demand, for the current 24-hour period and each day during the required previous days as per current HOS regulations.

4.1.5 Non-Authenticated Operation

a) An ELD must associate all non-authenticated operation of a CMV with a single ELD account labeled unidentified driver.

b) If a driver does not log onto the ELD, as soon as the vehicle is in motion, the ELD must:

(1) Provide a visual or visual and audible warning reminding the driver to stop and log in to the ELD;

(2) Record accumulated driving and on-duty not-driving time in accordance with the ELD defaults described in section 4.4.1 of this Standard under the unidentified driver profile; and

(3) Not allow entry of any information into the ELD other than a response to the login prompt.

4.2   ELD-Vehicle Interface

a) An ELD must be integrally synchronized with the engine of the CMV. Engine synchronization for purposes of ELD compliance means the monitoring of the vehicle's engine operation to automatically capture the engine's power status, vehicle's motion status, total distance driven value, and engine hours value when the CMV's engine is powered.

b) If the CMV has an engine electronic control module (ECM), the ELD must establish a link to the engine ECM when the CMV's engine is powered and receive automatically the engine's power status, vehicle's motion status, total distance driven value and engine hours value through the serial or Control Area Network communication protocols supported by the vehicle's engine ECM. If the CMV does not have an ECM or any required data element cannot be captured from the engine ECM, an ELD must use alternative sources to obtain or estimate these vehicle parameters with the listed accuracy requirements under section 4.3.1 of this Standard.

c) If the ELD is implemented on a handheld unit and cannot temporarily establish a link to the engine ECM (limited connectivity) as specified in this section, the ELD must meet the requirements specified in section 4.6.1.2 of this Standard. Limited connectivity for purposes of ELD compliance means the time period when the ELD cannot establish a link to the engine ECM when the handheld unit is disconnected or outside the vehicle.

4.3   ELD Inputs

4.3.1   ELD Sensing

4.3.1.1   Engine Power Status

An ELD must be powered and become fully functional within 1 minute of the vehicle's engine receiving power and must remain powered for as long as the vehicle's engine stays powered.

4.3.1.2   Vehicle Motion Status

a) An ELD must automatically determine whether a CMV is in motion or stopped by comparing the vehicle speed information with respect to a set speed threshold as follows:

    (1)   Once the vehicle speed exceeds the set speed threshold, it must be considered in motion.

    (2)   Once in motion, the vehicle must be considered in motion until its speed falls to 0 km/h and stays at 0 km/h for 3 consecutive seconds. Then, the vehicle will be considered stopped.

    (3)   An ELD's set speed threshold for determination of the in-motion state for the purpose of this section must not be configurable to greater than 8 km/h.

b) If an ELD is required to have a link to the vehicle's engine ECM, vehicle speed information must be acquired from the engine ECM. Otherwise, vehicle speed information must be acquired using an independent source apart from the positioning services described under section 4.3.1.6 of this Standard and must be accurate within ±5 km/h of the CMV's true ground speed for purposes of determining the in-motion state for the CMV.

4.3.1.3 Vehicle Distance

a) An ELD must monitor vehicle distance as accumulated by a CMV over the course of an ignition power on cycle (accumulated vehicle distance) and over the course of CMV's operation (total vehicle distance). Vehicle distance information must use or must be converted to units of whole kilometers.

b) If the ELD is required to have a link to the vehicle's engine ECM as specified in section 4.2 of this Standard:

    (1) The ELD must monitor the engine ECM's odometer message broadcast and use it to log total vehicle distance information; and

    (2) The ELD must use the odometer message to determine accumulated vehicle distance since engine's last power on instance.

c) If the ELD is not required to have a link to the vehicle's engine ECM as specified in section 4.2 of this Standard, the accumulated vehicle distance indication must be obtained or estimated from a source that is accurate to within ±10% of distance accumulated by the CMV over a 24-hour period as indicated on the vehicle's odometer display.

d) An ELD must monitor the cumulative distance driven for personal use throughout the 24-hour period.

e) Accumulated vehicle distance must exclude the distance driven in respect of the driver's personal use of the vehicle.

f) If the ELD and the CMV's engine are powered at the end of the 24-hour period, the ELD must automatically capture the Total Vehicle Distance value from the engine ECM. As specified in section 4.8.1.3 of this Standard, such value must be reported as the ''End Odometer'' of the current 24-hour period, and the ''Start Odometer'' of the next 24-hour period.

4.3.1.4 Engine Hours

a) An ELD must monitor engine hours of the CMV over the course of an ignition power on cycle (elapsed engine hours) and over the course of the total engine hours of the CMV's operation. Engine hours must use or must be converted to hours in intervals of a tenth of an hour.

b) If an ELD is required to have a link to the vehicle's engine ECM, the ELD must monitor the engine ECM's total engine hours message broadcast and use it to log total engine hours information. Otherwise, engine hours must be obtained or estimated from a source that monitors the ignition power of the CMV and must be accurate within ±0.1 hour of the engine's total operation within a given ignition power on cycle.

4.3.1.5 Date and Time

a) The ELD must obtain and record the date and time information automatically without allowing any external input or interference from a motor carrier, driver, or any other person.

b) The ELD time must be synchronized to Coordinated Universal Time (UCT) and the absolute deviation from UCT must not exceed 10 minutes at any point in time.

4.3.1.6 CMV Position

a) An ELD must determine automatically the position of the CMV in standard latitude/longitude coordinates with the accuracy and availability requirements of this section.

b) The ELD must obtain and record this information without allowing any external input or interference from a motor carrier, driver, or any other person.

c) CMV position measurement must be accurate to ±0.8 kilometer of absolute position of the CMV when an ELD measures a valid latitude/longitude coordinate value.

d) Position information must be obtained in or converted to standard signed latitude and longitude values and must be expressed as decimal degrees to hundreds of a degree precision (i.e., a decimal point and two decimal places).

e) Measurement accuracy combined with the reporting precision requirement implies that position reporting accuracy will be on the order of ±1.6 kilometer of absolute position of the CMV during the course of a CMV's commercial operation.

f) An ELD must be able to acquire a valid position measurement at least once every 8 kilometers of driving; however, the ELD records CMV location information only during ELD events as specified in section 4.5.1 of this Standard.

4.3.1.7 CMV VIN

Section not required.

4.3.2 Driver's Manual Entries

a) An ELD must prompt the driver to input information into the ELD only when the CMV is stationary and driver's duty status is not on-duty driving, except for the condition specified in section 4.4.1.2 of this Standard.

b) If the driver's duty status is driving, an ELD must only allow the driver who is operating the CMV to change the driver's duty status to another duty status.

c) A stopped vehicle must maintain zero (0) km/h speed to be considered stationary for purposes of information entry into an ELD.

d) An ELD must allow an authenticated co-driver who is not driving, but who has logged into the ELD prior to the vehicle being in motion, to make entries over his or her own records when the vehicle is in motion. The ELD must not allow co-drivers to switch driving roles when the vehicle is in motion.

4.3.2.1 Driver's Entry of Required Event Data Fields

a) An ELD must provide a means for a driver to enter information pertaining to the driver's ELD records manually.

b) If these fields are populated automatically, the ELD must provide means for the driver to review such information and make corrections as necessary.

4.3.2.2   Driver's Status Inputs

4.3.2.2.1   Driver's Indication of Duty Status

a) An ELD must provide a means for the authenticated driver to select a driver's duty status.

b) The ELD must use the ELD duty status categories listed in Table 1 of this Standard.

Table 1		
Duty Status Categories		
Duty Status	**Abbreviation**	**Data Coding**
Off Duty	OFF	1
Sleeper Berth	SB	2
Driving	D	3
On-duty Not Driving	ON	4

4.3.2.2.2   Driver's Indication of Situations Impacting Driving Time Recording

a) An ELD must provide the means for a driver to indicate the beginning and end of a period when the driver may use the CMV for authorized personal use or for performing yard moves. The ELD must acquire this status in a standard format from the category list in Table 2 of this Standard. This list must be supported independent of the duty status categories described in section 4.3.2.2.1 of this Standard.

b) An ELD must allow a driver to select only categories that a motor carrier enables by configuration for that driver, as described in section 4.3.3.1.1 of this Standard.

c) An ELD must only allow one category to be selected at any given time and use the latest selection by the driver.

d) The ELD must prompt the driver to enter an annotation upon selection of a category from Table 2 of this Standard and record the driver's entry.

e) A driver's indication of special driving situation must reset to none if the ELD or CMV's engine goes through a power off cycle (ELD or CMV's engine turns off and then on) except if the driver has indicated authorized personal use of CMV. If the driver has indicated authorized personal use of the CMV, the ELD must require confirmation of continuation of the authorized personal use of CMV condition by the driver. If not confirmed by the driver and the vehicle is in motion, the ELD must default to none.

f) If the accumulated distance driven for personal use throughout the 24-hour period exceeds the maximum distance allowed under current HOS regulations, the ELD must not allow the driver to indicate the beginning of a period for authorized personal use.

g) If the ELD is implemented on a handheld unit and has not establish a link to the engine ECM as described in section 4.2 of this Standard, the ELD must not allow the driver to indicate the beginning or end of a period when the driver may use the CMV for authorized personal use or for performing yard moves.

Table 2		
Categories for Driver's Indication of Situations Impacting Driving Time Recording		
Category	**Abbreviation**	**Data Coding**
Authorized Personal Use of CMV	PC	1
Yard Moves	YM	2
Default: None	---	0

4.3.2.2.3 Driver's Indication of Situations Impacting Off-Duty Time Requirements

a) An ELD must provide the means for a driver to indicate deferral of daily Off-duty time to the following 24-hour period.

    (1) This function must be available only if the driver is not splitting off-duty time for the current 24-hour period.

    (2) This function, when selected, must prompt the driver to affirmatively review and confirm the off-duty time to be deferred.

    (3) The Off-duty time deferred must not exceed the maximum time allowed under current HOS regulations.

    (4) Upon driver confirmation, the ELD must defer the off-duty time to the following 24-hour period and set the "Off-duty Time Deferral Status" to "Day one" for the current 24-hour period.

    (5) The ELD must record the driver's confirmation as an event, and include data elements specified in section 4.5.1.8.

    (6) Upon driver confirmation, the ELD must also set the new Off-Duty-hour minimum requirements for the current 24-hour period.

b) When Off-duty time has been deferred during the previous 24-hour period:

    (1) The ELD must clearly indicate the Off-duty time deferred for that driver during the previous 24-hour period.

    (2) The ELD must prompt the driver to affirmatively review and confirm the new Off-duty-hour minimum requirements for the current 24-hour period.

    (3) Upon driver confirmation, the ELD must set the "Off-duty Time Deferral Status" to "Day two" for the current 24-hour period.

    (4) The ELD must record the driver's confirmation as an event, and include data elements specified in section 4.5.1.8.

    (5) Upon driver confirmation, the ELD must set the new Off-duty-hour minimum requirements for the current 24-hour period.

4.3.2.2.4   Indication of Situations Impacting duty-/driving-hour limitations

a) An ELD must provide the means to indicate a cycle change.

    (1) This function must be available only if the minimum off-duty time requirements specified in the HOS regulations are met.

    (2) This function, when selected, must prompt the driver to affirmatively review and confirm the new cycle (cycle 1 or cycle 2) and new duty-/driving-hour limitations.

    (3) The ELD must record the driver's confirmation as an event, and include data elements specified in section 4.5.1.9 of this Standard.

    (4) Upon driver confirmation, the ELD must set back to zero the accumulated cycle hours and set the new cycle and duty-/driving-hour limitations.

b) An ELD must provide the means to indicate an operating jurisdiction change.

    (1) This function, when selected, must prompt the driver to confirm the new operating jurisdiction and duty-/driving-hour limitations for the current 24-hour period, work shift and cycle.

    (2) Upon driver confirmation, the ELD must set the new operating jurisdiction and new duty-/driving-hour limitations.

    (3) The ELD must also record the driver's confirmation as an event, and include data elements specified in section 4.5.1.10 of this Standard.

c) An ELD must provide the means to indicate additional hours that were not recorded for the current motor carrier during the required previous days.

    (1) This function, when selected, must prompt the user to select one of the following options:

        i. Option 1: additional hours already recorded and reported in an ELD for another motor carrier.

        ii. Option 2: additional hours not recorded since the driver was not required to keep a daily log immediately before the beginning of the 24-hour period.

    (2) When Option 1 is selected, the ELD must prompt the user to enter for each 24-hour period, the date, the time for beginning and end of each work shift period, and the total hours for each duty status.

    (3) When Option 2 is selected, the ELD must prompt the user to enter for each 24-hour period during the required previous days, the date, the time for beginning and end of each work shift period, and the total hours for on-duty and off-duty statuses.

    (4) Upon confirmation of data entry as described under option 1 or 2 of this section, the ELD must add those hours to the total hours already cumulated for each duty status and set the new duty-/driving-hour limitations.

    (5) Upon confirmation of data entry as described under option 2 of this section, the ELD must also record the driver's confirmation as an event, and include data elements specified in section 4.5.1.11 of this Standard.

4.3.2.3 Driver's Certification of Records

a) An ELD must include a function whereby a driver can certify the driver's records at the end of a 24-hour period.

    (1) This function, when selected, must display a statement that reads "I hereby certify that my data entries and my record of duty status for this 24-hour period are true and correct."

    (2) An ELD must prompt the driver to select "Agree" or "Not ready." An ELD must record the driver's affirmative selection of "Agree" as an event.

b) An ELD must only allow the authenticated driver to certify records associated with that driver.

c) If any edits are necessary after the driver certifies the records for a given 24-hour period, the ELD must require and prompt the driver to re-certify the updated records.

d) If there are any past records on the ELD (excluding the current 24-hour period) that require certification or re-certification by the driver, the ELD must indicate the required driver action on the ELD's display and prompt the driver to take the necessary action.

4.3.2.4 Driver's Data Transfer Initiation Input

a) An ELD must provide a standardized single-step driver interface for compilation of driver's ELD records and initiation of the data transfer to authorized safety officials when requested during a roadside inspection.

b) The ELD must input the data transfer request from the driver, require confirmation, present and request selection of the supported data transfer options by the ELD, and prompt for entry of the output file comment as specified in section 4.3.2.5 of this Standard. Upon confirmation, the ELD must generate the compliant output file and perform the data transfer.

c) The supported single-step data transfer initiation mechanism (such as a switch or an icon on a touch-screen display) must be clearly marked and visible to the driver when the vehicle is stopped.

d) If the data transfer option selected by the driver is email or fax, the ELD must prompt the driver to enter the email address or fax number provided by the enforcement officer.

4.3.2.5 Driver's Entry of an Output File Comment

An ELD must accommodate the entry of an output file comment up to 60 characters long. If an authorized safety official provides a key phrase or code during an inspection to be included in the output file comment, it must be entered and embedded in the electronic ELD records in the exchanged dataset as specified in section 4.9.1 of this Standard. The default value for the output file comment must be blank. This output file comment must be used only for the creation of the related output files for the intended time, place, and ELD user.

4.3.2.6 Driver's Annotation of Records

a) An ELD must allow a driver to add annotations in text format to recorded, entered, or edited ELD events.

b) The ELD must require annotations to be 4 characters or longer, including embedded spaces, if driver annotation is required and driver is prompted by the ELD.

4.3.2.7 Driver's Entry of Location Information

a) An ELD must allow manual entry of a CMV's location by the driver in text format in support of the driver edit requirements described in section 4.3.2.8 of this Standard.

b) The driver's manual location entry must be available as an option to a driver only when prompted by the ELD under allowed conditions as described in section 4.6.1.4 of this Standard.

c) A manual location entry must show "M" in the latitude/longitude coordinates fields in ELD records.

4.3.2.8 Driver's Record Entry/Edit

a) An ELD must provide a mechanism for a driver to review, edit, and annotate the driver's ELD records when a notation of errors or omissions is necessary or enter the driver's missing ELD records subject to the requirements specified in this section.

b) An ELD must not permit alteration or erasure of the original information collected concerning the driver's ELD records or alteration of the source data streams used to provide that information.

4.3.2.8.1 Mechanism for Driver Edits and Annotations

a) If a driver edits or annotates an ELD record or enters missing information, the act must not overwrite the original record.

b) The ELD must use the process outlined in section 4.4.4.2 of this Standard to configure required event attributes to track the edit history of records.

c) Driver edits must be accompanied by an annotation. The ELD must prompt the driver to annotate edits.

4.3.2.8.2 Driver Edit Limitations

a) An ELD must not allow or require the editing or manual entry of records with the following event types, as described in section 7.25 of this Standard:
(1) A driver's login/logout activity
(2) CMV's engine power up/shut down, or
(3) ELD malfunctions and data diagnostic events.

b) An ELD must not allow automatically recorded driving time to be shortened or the ELD username associated with an ELD record to be edited or reassigned, except under the following circumstances:
(1) Assignment of Unidentified Driver records. ELD events recorded under the "Unidentified Driver" profile may be edited and assigned to the driver associated with the record; and
(2) Correction of errors with team drivers. In the case of team drivers, the driver account associated with the driving time records may be edited and reassigned between the team drivers if there was a mistake resulting in a mismatch between the actual driver and the driver recorded by the ELD and if both team drivers were respectively indicated in each other's records as a co-driver. The ELD must require each co-driver to confirm the change for the corrective action to take effect.

c) An ELD must not allow recorded on-duty time during a yard move event to be shortened, except if the new duty status category is set to Driving.

4.3.3 Motor Carrier's Manual Entries

An ELD must restrict availability of motor carrier entries outlined in this section only to authenticated "support personnel" account holders.

4.3.3.1 ELD Configuration

If an ELD or a technology that includes an ELD function offers configuration options to the motor carrier or the driver that are not otherwise addressed or prohibited in this Standard, the configuration options

must not affect the ELD's compliance with the requirements of this rule for each configuration setting of the ELD.

4.3.3.1.1 Configuration of Available Categories Impacting Driving Time Recording

a) An ELD must allow a motor carrier to unilaterally configure the availability of each of the three categories listed on Table 2 of this Standard that the motor carrier chooses to authorize for each of its drivers. By default, none of these categories must be available to a new driver account without the motor carrier proactively configuring their availability.

b) A motor carrier may change the configuration for the availability of each category for each of its drivers. Changes to the configuration setting must be recorded on the ELD and communicated to the applicable authenticated driver during the ELD login process.

4.3.3.1.2 Configuration of Using ELDs

a) An ELD must provide the motor carrier the ability to configure a driver account exempt from use of an ELD.

b) The ELD must default the setting of this configuration option for each new driver account created on an ELD to "no exemption."

c) An exemption must be proactively configured for an applicable driver account by the motor carrier. The ELD must prompt the motor carrier to annotate the record and provide an explanation for the configuration of exemption.

d) If a motor carrier configures a driver account as exempt:

(1) The ELD must present the configured indication that is in effect for that driver during the ELD login and logout processes.

(2) The ELD must continue to record ELD driving time but suspend detection of missing data elements data diagnostic event for the driver described in section 4.6.1.5 of this Standard and data transfer compliance monitoring function described in section 4.6.1.7 when such driver is authenticated on the ELD.

4.3.3.1.3 Motor Carrier's Post-Review Electronic Edit Requests

a) An ELD may allow the motor carrier (via a monitoring algorithm or support personnel) to screen, review, and request corrective edits to the driver's certified (as described in section 4.3.2.3 of this Standard) and submitted records through the ELD system electronically. If this function is implemented by the ELD, the ELD must also support functions for the driver to see and review the requested edits.

b) Edits requested by anyone or any system other than the driver must require the driver's electronic confirmation or rejection.

4.4   ELD Processing and Calculations

4.4.1   Conditions for Automatic Setting of Duty Status

4.4.1.1   Automatic Setting of Duty Status to Driving

An ELD must automatically record driving time when the vehicle is in motion by setting duty status to driving for the driver unless, before the vehicle is in motion, the driver:

a) Sets the duty status to off-duty and indicates personal use of CMV, in which case duty status must remain off-duty until driver's indication of the driving condition ends or until the cumulative distance driven for personal use throughout the 24-hour period exceeds the maximum distance allowed under the personal use provision of the HOS regulations; or

b) Sets the duty status to on-duty not driving and indicates yard moves, in which case duty status must remain on-duty not driving until driver's indication of the driving condition ends.

4.4.1.2   Automatic Setting of Duty Status to On-Duty Not Driving

When the duty status is set to driving, and the CMV has not been in-motion for 5 consecutive minutes, the ELD must prompt the driver to confirm continued driving status or enter the proper duty status. If the driver does not respond to the ELD prompt within 1-minute after receiving the prompt, the ELD must automatically switch the duty status to on-duty not driving. The time thresholds for purposes of this section must not be configurable.

4.4.1.3   Other Automatic Duty-Status Setting Actions Prohibited

An ELD must not feature any other automatic records of duty setting mechanism than those described in sections 4.4.1.1 and 4.4.1.2 of this Standard. Duty status changes that are not initiated by the driver, including duty status alteration recommendations by motor carrier support personnel or a software algorithm, are subject to motor carrier edit requirements in section 4.3.3.1.3.

4.4.2   Geo-Location Conversions

a) For each change in duty status, the ELD must convert automatically captured vehicle position in latitude/longitude coordinates into geo-location information, indicating approximate distance and direction to an identifiable location corresponding to the number or highway name (if applicable), or the name of a nearby city, town, village or municipality, and name of the province, territory or state abbreviation.

b) Geo-location information for all Canadian jurisdictions must be derived from a database that contains all locations (cities, towns, villages, municipalities, etc.) listed in the latest database provided by the ELD Registration Authority.

c) An ELD's viewable outputs (such as printouts or display) must feature geo-location information as place names in text format.

d) At least every year, the ELD must update the Geo-location information corresponding to the latest release of the database specified in paragraph (b) of this section.

4.4.3 Date and Time Conversions

a) An ELD must have the capability to convert and track date and time captured in UTC standard to the time standard in effect at driver's home terminal, taking the daylight savings time changes into account by using the parameter "Time Zone Offset from UTC" as specified in section 7.41 of this Standard.

b) An ELD must record the driver's record of duty status using the time standard in effect at the driver's home terminal for a 24-hour period beginning with the time specified by the motor carrier for that driver's home terminal.

c) The data element "Time Zone Offset from UTC" must be included in the "Driver's Certification of Own Records" events as specified in section 4.5.1.4 of this Standard.

4.4.4 Setting of Event Parameters in Records, Edits, and Entries

This section describes the security measures for configuring and tracking event attributes for ELD records, edits, and entries in a standardized manner.

4.4.4.1 Event Sequence Identifier (ID) number

a) Each ELD event must feature an event sequence ID number.

   1) The event sequence ID number for each ELD event must use continuous numbering across all users of that ELD and across engine and ELD power on and off cycles.

   2) An ELD must use the next available event sequence ID number (incremented by one) each time a new event log is recorded.

   3) The event sequence ID number must track at least the last 65,536 unique events recorded on the ELD.

b) The continuous event sequence ID numbering structure used by the ELD must be mapped into a continuous hexadecimal number between 0000 (Decimal 0) and FFFF (Decimal 65535).

4.4.4.2 Event Record Status, Event Record Origin, Event Type Setting

a) An ELD must retain the original records even when allowed edits and entries are made over a driver's ELD records.

b) An ELD must keep track of all event record history, and the process used by the ELD must produce the event record status, event record origin, record edit date, record edit time, record edit originator, and event type for the ELD records in the standard categories specified in sections 7.23, 7.22, and 7.25 of this Standard, respectively for each record as a standard security measure.

4.4.4.2.1 Records Automatically Logged by ELD

At the instance an ELD creates a record automatically, the ELD must:

a) Set the "Event Record Status" to "1" (active); and

b) Set the "Event Record Origin" to "1" (automatically recorded by ELD).

4.4.4.2.2 Driver Edits

At the instance of a driver editing existing record(s), the ELD must:

a) Identify the ELD record(s) being modified for which the "Event Record Status" is currently set to "1" (active);

b) Acquire driver input for the intended edit and construct the ELD record(s) that will replace the record(s) identified in paragraph 4.4.4.2.2(a) of this Standard;

c) Set the "Event Record Status" of the ELD record(s) identified in paragraph 4.4.4.2.2(a) of this Standard, which is being modified, to "2" (inactive-changed);

d) Set the "Event Record Status" of the ELD record(s) constructed in paragraph 4.4.4.2.2(b) of this Standard to "1" (active);

e) Set the "Event Record Origin" of the ELD record(s) constructed in paragraph 4.4.4.2.2(b) of this Standard to "2" (edited or entered by the driver);

f) Set the "Record Edit Date" of the ELD record(s) identified in paragraph 4.4.4.2.2(a) of this Standard, which is being modified, to current date as described in section 7.8;

g) Set the "Record Edit Date" of the ELD record(s) constructed in paragraph 4.4.4.2.2(b) of this Standard to current date as described in section 7.8;

h) Set the "Record Edit Time" of the ELD record(s) identified in paragraph 4.4.4.2.2(a) of this Standard, which is being modified, to current time as described in section 7.40; and

i) Set the "Record Edit Time" of the ELD record(s) constructed in paragraph 4.4.4.2.2(b) of this Standard to current time as described in section 7.40.

4.4.4.2.3 Driver Entries

When a driver enters missing record(s), the ELD must:

a) Acquire driver input for the missing entries being implemented and construct the new ELD record(s) that will represent the driver entries;

b) Set the "event record status" of the ELD record(s) constructed in paragraph 4.4.4.2.3(a) of this Standard to "1" (active);

c) Set the "event record origin" of the ELD record(s) constructed in paragraph 4.4.4.2.3(a) of this Standard to "2" (edited or entered by the driver);

d) Set the "Record Edit Date" of the ELD record(s) constructed in paragraph 4.4.4.2.3(a) of this Standard to current date as described in section 7.8; and

e) Set the "Record Edit Time" of the ELD record(s) constructed in paragraph 4.4.4.2.3(a) of this Standard to current time as described in section 7.40.

4.4.4.2.4 Driver's Assumption of Unidentified Driver Logs

When a driver reviews and assumes ELD record(s) logged under the unidentified driver profile, the ELD must:

a) Identify the ELD record(s) logged under the unidentified driver profile that will be reassigned to the driver;

b) Use elements of the unidentified driver log(s) from paragraph 4.4.4.2.4(a) of this Standard and acquire driver input to populate missing elements of the log originally recorded under the unidentified driver profile, and construct the new event record(s) for the driver;

c) Set the "event record status" of the ELD record(s) identified in paragraph 4.4.4.2.4(a) of this Standard, which is being modified, to "2" (inactive–changed);

d) Set the "event record status" of the ELD record(s) constructed in paragraph 4.4.4.2.4(b) of this Standard to "1" (active); and

e) Set the "event record origin" of the ELD record(s) constructed in paragraph 4.4.4.2.4(b) of this Standard to "4" (assumed from unidentified driver profile).

4.4.4.2.5 Motor Carrier Edit Suggestions

If a motor carrier requests an edit on a driver's records electronically, the ELD must:

a) Identify the ELD record(s) the motor carrier requests to be modified for which the "event record status" is currently set to "1" (active);

b) Acquire motor carrier input for the intended edit and construct the ELD record(s) that will replace the record identified in paragraph 4.4.4.2.5(a) of this Standard —if approved by the driver;

c) Set the "event record status" of the ELD record(s) in paragraph 4.4.4.2.5(b) of this Standard to "3" (inactive–change requested); and

d) Set the "event record origin" of the ELD record constructed in paragraph 4.4.4.2.5(b) of this Standard to "3" (edit requested by an authenticated user other than the driver);

e) Set the "Record Edit Date" of the ELD record(s) identified in paragraph 4.4.4.2.5(a) of this Standard, to current Date as described in section 7.8;

f) Set the "Record Edit Date" of the ELD record(s) constructed in paragraph 4.4.4.2.5(b) of this Standard to current Date as described in section 7.8;

g) Set the "Record Edit Time" of the ELD record(s) identified in paragraph 4.4.4.2.5(a) of this Standard, to current Time as described in section 7.40;

h) Set the "Record Edit Time" of the ELD record(s) constructed in paragraph 4.4.4.2.5(b) of this Standard to current Time as described in section 7.40;

i) Set the "Record Edit Originator" of the ELD record(s) identified in paragraph 4.4.4.2.5(a) of this Standard, to current ELD username as described in section 7.18; and

j) Set the "Record Edit Originator" of the ELD record(s) constructed in paragraph 4.4.4.2.5(b) of this Standard to current ELD username as described in section 7.18.

4.4.4.2.6   Driver's Actions Over Motor Carrier Edit Suggestions

a) If edits are requested by the motor carrier, the ELD must allow the driver to review the requested edits and indicate on the ELD whether the driver confirms or rejects the requested edit(s).

b) If the driver approves the motor carrier's edit suggestion the ELD must:

   (1) Set the "event record status" of the ELD record(s) identified under paragraph 4.4.4.2.5 (a) of this Standard being modified, to "2" (inactive–changed); and

   (2) Set the "event record status" of the ELD record(s) constructed in paragraph 4.4.4.2.5 (b) of this Standard to "1" (active).

c) If the driver disapproves the motor carrier's edit(s) suggestion, the ELD must set the "event record status" of the ELD record(s) identified in paragraph 4.4.4.2.5 (b) of this Standard to "4" (inactive–change rejected).

4.4.5   Data Integrity Check Functions

Section not required.

4.4.6   HOS duty-/driving-hour limitations

a) An ELD must track total hours for each driver, each duty status and for current operating jurisdiction, 24-hour period, work shift and cycle being used.

b) An ELD must automatically set the duty-/driving-hour limitations for the current operating jurisdiction, 24-hour period, work shift and cycle being used as per prescribed limitations in the HOS regulations.

c) If the driver has indicated additional hours as described in section 4.3.2.2.4 (c) of this Standard, these additional hours must also be accounted for to notify the driver prior to any duty-/driving-hour limitation prescribed in the HOS regulations.

4.5   ELD Recording

4.5.1   Events and Data to Record

a) An ELD must record data for all discrete events specified in sections 4.5.1.1 – 4.5.1.11 of this Standard.

b) If the ELD is implemented on a handheld unit and has not establish a link to the engine ECM as described in section 4.2 of this Standard, a subset of the required data elements must be omitted in the records, except for the following event types:

   (1) driver's indication of personal use of CMV or yard moves,

   (2) CMV's engine power up/shut down.

c) When the ELD is implemented on a handheld unit and meets the requirements specified in paragraph (b) of this section, a subset of the required data elements must be omitted in the event records, and the ELD must:

   (1) Omit recording vehicle distance and engine hours fields by leaving them blank;

   (2) Omit recording vehicle information fields by leaving them blank. In this paragraph, vehicle information means the CMV Power Unit Number or licence plate associated with the event record.

d) At each instance when a subset of the required data elements is omitted in the records, the ELD must prompt the driver to acknowledge and confirm that required data elements were omitted in the event record.

e) For all data elements omitted in the event records, the ELD must not permit alteration of the original information recorded, as specified in section 4.3.2.8 of this Standard.

4.5.1.1 Event: Change in Driver's Duty Status

When a driver's duty status changes, the ELD must associate the record with the driver, the record originator if created during an edit or entry, the vehicle and the motor carrier, and must include the following data elements:

a) <Event Sequence ID Number> as described in section 7.24 of this Standard;

b) <Event Record Status> as described in section 7.23;

c) <Event Record Origin> as described in section 7.22;

d) <Event Type> as described in section 7.25;

e) <Event Code> as described in section 7.20;

f) <{Event} Date> as described in section 7.8;

g) <{Event} Time> as described in section 7.40;

h) <{Accumulated} Vehicle Distance> as described in section 7.43;

i) <{Elapsed} Engine Hours> as described in section 7.19;

j) <{Event} Latitude> as described in section 7.31;

k) <{Event} Longitude> as described in section 7.33;

l) <Distance Since Last Valid Coordinates> as described in section 7.9;

m) <Malfunction Indicator Status {for ELD}> as described in section 7.35;

n) <Data Diagnostic Event Indicator Status {for Driver}> as described in section 7.7;

o) <{Event} Comment /Annotation> as described in section 7.6;

p) <Driver's Location Description> as described in section 7.12;

q) <{Edit Record} Date> as described in section 7.8;

r) <{Edit Record} Time> as described in section 7.40; and

s) <{Edit Record} Originator> as described in section 7.18.

4.5.1.2 Event: Intermediate Logs

Section not required.

4.5.1.3 Event: Change in Driver's Indication of Allowed Conditions that Impact Driving Time Recording

a) At each instance when the status of a driver's indication of personal use of CMV or yard moves changes, the ELD must record a new event.

b) The ELD must associate the record with the driver, the vehicle and the motor carrier, and must include the following data elements:

1) <Event Sequence ID Number> as described in section 7.24 of this Standard;
2) <Event Record Status> as described in section 7.23;
3) <Event Record Origin> as described in section 7.22;
4) <Event Type> as described in section 7.25;
5) <Event Code> as described in section 7.20;
6) <{Event} Date> as described in section 7.8;
7) <{Event} Time> as described in section 7.40;
8) <{Accumulated} Vehicle Distance> as described in section 7.43;
9) <{Elapsed} Engine Hours> as described in section 7.19;
10) <{Event} Latitude> as described in section 7.31;
11) <{Event} Longitude> as described in section 7.33;
12) <Distance Since Last Valid Coordinates> as described in section 7.9;
13) <Malfunction Indicator Status {for ELD}> as described in section 7.35;
14) <Data Diagnostic Event Indicator Status {for Driver}> as described in section 7.7;
15) <{Event} Comment /Annotation> as described in section 7.6;
16) <Driver's Location Description> as described in section 7.12;
17) <{Edit Record} Date> as described in section 7.8;
18) <{Edit Record} Time> as described in section 7.40;
19) <{Edit Record} Originator> as described in section 7.18; and
20) <{Total } Vehicle Distance> as described in section 7.43.

4.5.1.4 Event: Driver's Certification of Own Records

a) At each instance when a driver certifies or re-certifies that the driver's records for a given 24-hour period are true and correct, the ELD must record the event.

b) The ELD must associate the record with the driver, the vehicle and the motor carrier, and must include the following data elements:

(1) <Event Sequence ID Number> as described in section 7.24 of this Standard;
(2) <Event Type> as described in section 7.25;
(3) <Event Code> as described in section 7.20;
(4) <Time Zone Offset from UTC> as described in section 7.41;
(5) <{Event} Date>and <Date {of the certified record}> as described in section 7.8; and
(6) <{Event} Time> as described in section 7.40.

4.5.1.5   Event: Driver's Login/Logout Activity

a) At each instance when an authorized user logs in and out of the ELD, the ELD must record the event.

b) The ELD must associate the record with the driver, the vehicle and the motor carrier, and must include the following data elements:

    (1) <Event Sequence ID Number> as described in section 7.24 of this Standard;

    (2) <Event Type> as described in section 7.25;

    (3) <Event Code> as described in section 7.20;

    (4) <{Event} Date> as described in section 7.8;

    (5) <{Event} Time> as described in section 7.40; and

    (6) <{Total} Vehicle Distance> as described in section 7.43.

    (7) <{Total} Engine Hours> as described in section 7.19.

4.5.1.6   Event: CMV's Engine Power Up and Shut Down Activity

a) When a CMV's engine is powered up or shut down, an ELD must record the event within 1 minute of occurrence and retain the earliest shut down and latest power-up event if the CMV has not moved since the last ignition power on cycle.

b) The ELD must associate the record with the driver or the unidentified driver profile, the vehicle, and the motor carrier, and must include the following data elements:

    (1) <Event Sequence ID Number> as described in section 7.24 of this Standard;

    (2) <Event Type> as described in section 7.25;

    (3) <Event Code> as described in section 7.20;

    (4) <{Event} Date> as described in section 7.8;

    (5) <{Event} Time> as described in section 7.40;

    (6) <{Total} Vehicle Distance> as described in section 7.43;

    (7) <{Total} Engine Hours> as described in section 7.19;

    (8) <{Event} Latitude> as described in section 7.31;

    (9) <{Event} Longitude> as described in section 7.33; and

    (10) <Distance Since Last Valid Coordinates> as described in section 7.9.

4.5.1.7   Event: ELD Malfunction and Data Diagnostics Occurrence

a) At each instance when an ELD malfunction or data diagnostic event is detected or cleared by the ELD, the ELD must record the event.

b) The ELD must associate the record with the driver, the vehicle and the motor carrier, and must include the following data elements:

    (1) <Event Sequence ID Number> as described in section 7.24 of this Standard;

    (2) <Event Type> as described in section 7.25;

    (3) <Event Code> as described in section 7.20;

    (4) <Malfunction/Diagnostic Code> as described in section 7.34;

    (5) <{Event} Date> as described in section 7.8;

    (6) <{Event} Time> as described in section 7.40;

    (7) <{Total} Vehicle Distance> as described in section 7.43; and

    (8) <{Total} Engine Hours> as described in section 7.19.

4.5.1.8   Event: Off-Duty Time Deferral

a) At each instance when the Off-duty time deferral status changes, the ELD must record a new event.

b) The ELD must associate the record with the driver, the record originator, the vehicle and the motor carrier, and must include the following data elements:

   (1)   <Event Sequence ID Number> as described in section 7.24 of this Standard;

   (2)   <Event Record Status> as described in section 7.23;

   (3)   <Event Record Origin> as described in section 7.22;

   (4)   <Event Type> as described in section 7.25;

   (5)   <Event Code> as described in section 7.20;

   (6)   <{Event} Date> as described in section 7.8;

   (7)   <{Event} Time> as described in section 7.40;

   (8)   <{Event} Comment /Annotation> as described in section 7.6;

   (9)   <Off-duty Time Deferral Status> as described in section 7.44;

   (10)   <Off-duty Time Deferred> as described in section 7.45;

   (11)   <{Edit Record} Date> as described in section 7.8;

   (12)   <{Edit Record} Time> as described in section 7.40; and

   (13)   <{Edit Record} Originator> as described in section 7.18.

4.5.1.9   Event: Change in Driver's Cycle

a) At each instance when the cycle changes to either cycle 1 or cycle 2, the ELD must record a new event.

b) The ELD must associate the record with the driver, the record originator, the vehicle and the motor carrier, and must include the following data elements:

   (1)   <Event Sequence ID Number> as described in section 7.24 of this Standard;

   (2)   <Event Record Status> as described in section 7.23;

   (3)   <Event Record Origin> as described in section 7.22;

   (4)   <Event Type> as described in section 7.25;

   (5)   <Event Code> as described in section 7.20;

   (6)   <{Event} Date> as described in section 7.8;

   (7)   <{Event} Time> as described in section 7.40;

   (8)   <{Event} Comment /Annotation> as described in section 7.6;

   (9)   <{Current} Cycle> as described in section 7.36;

   (10)   <{Edit Record} Date> as described in section 7.8;

   (11)   <{Edit Record} Time> as described in section 7.40; and

   (12)   <{Edit Record} Originator> as described in section 7.18.

4.5.1.10 Event: Change in Operating Jurisdiction

a) At each instance when the operating jurisdiction changes, the ELD must record a new event.

b) The ELD must associate the record with the driver, the record originator, the vehicle and the motor carrier, and must include the following data elements:

   (1) <Event Sequence ID Number> as described in section 7.24 of this Standard;

   (2) <Event Record Status> as described in section 7.23;

   (3) <Event Record Origin> as described in section 7.22;

   (4) <Event Type> as described in section 7.25;

   (5) <Event Code> as described in section 7.20;

   (6) <{Event} Date> as described in section 7.8;

   (7) <{Event} Time> as described in section 7.40;

   (8) <{Event} Latitude> as described in section 7.31;

   (9) <{Event} Longitude> as described in section 7.33;

   (10) <Distance Since Last Valid Coordinates> as described in section 7.9;

   (11) <{Event} Comment /Annotation> as described in section 7.6;

   (12) <Driver's Location Description> as described in section 7.12;

   (13) <{Current} Operating jurisdiction> as described in section 7.46;

   (14) <{Edit Record} Date> as described in section 7.8;

   (15) <{Edit Record} Time> as described in section 7.40; and

   (16) <{Edit Record} Originator> as described in section 7.18.

4.5.1.11 Event: Additional Hours Not Recorded

a) At each instance when an authorized user is entering additional hours that were not recorded during the required previous days as described in section 4.3.2.2.4 (Option 2) of this Standard, the ELD must record a new event.

b) The ELD must associate the record with the driver and the motor carrier, and must include the following data elements for each 24-hour period:

   (1) <Event Sequence ID Number> as described in section 7.24 of this Standard;

   (2) <Event Record Status> as described in section 7.23;

   (3) <Event Record Origin> as described in section 7.22;

   (4) <Event Type> as described in section 7.25;

   (5) <Event Code> as described in section 7.20;

   (6) <{Event} Date> as described in section 7.8;

   (7) <{Event} Time> as described in section 7.40;

   (8) <Date {of the 24-hour period}> as described in section 7.8;

   (9) <{Beginning of workshift} Time> and <{End of workshift} Time> as described in section 7.8;

   (10) <Total Hours {logged in Off-duty status}>;

   (11) <Total Hours {logged in on-duty not driving status}>;

   (12) <{Event} Comment /Annotation> as described in section 7.6;

   (13) <{Edit Record} Date> as described in section 7.8;

   (14) <{Edit Record} Time> as described in section 7.40; and

   (15) <{Edit Record} Originator> as described in section 7.18.

4.6 ELD's Self-Monitoring of Required Functions

An ELD must have the capability to monitor its compliance with the technical requirements of this section for the detectable malfunctions and data inconsistencies listed in Table 4 of this Standard (s. 7.34) and must keep records of its malfunction and data diagnostic event detection.

4.6.1 Compliance Self-Monitoring, Malfunctions and Data Diagnostic Events

4.6.1.1 Power Compliance Monitoring

a) An ELD must monitor data it receives from the engine ECM or alternative sources as allowed in sections 4.3.1.1–4.3.1.4 of this Standard, its onboard sensors, and data record history to identify instances when it may not have complied with the power requirements specified in section 4.3.1.1, in which case, the ELD must record a power data diagnostics event for the corresponding driver(s), or under the unidentified driver profile if no drivers were authenticated at the time of detection.

b) An ELD must set a power compliance malfunction if the power data diagnostics event described in paragraph 4.6.1.1(a) of this Standard indicates an aggregated in-motion driving time understatement of 30 minutes or more on the ELD over a 24-hour period across all driver profiles, including the unidentified driver profile.

4.6.1.2 Engine Synchronization Compliance Monitoring

a) An ELD must monitor the data it receives from the engine ECM or alternative sources as allowed in sections 4.3.1.1–4.3.1.4 of this Standard, its onboard sensors, and data record history to identify instances and durations of its non-compliance with the ELD engine synchronization requirement specified in section 4.2.

b) An ELD required to establish a link to the engine ECM as described in section 4.2 must monitor its connectivity to the engine ECM and its ability to retrieve the vehicle parameters described under section 4.3.1 of this Standard and must record an engine-synchronization data diagnostics event when it no longer can acquire updated values for the ELD parameters required for records within 5 seconds of the need.

c) An ELD must set an engine synchronization compliance malfunction if connectivity to any of the required data sources specified in section 4.3.1 of this Standard is lost for more than 30 minutes during a 24-hour period aggregated across all driver profiles, including the unidentified driver profile.

d) If the ELD is implemented on a handheld unit, the ELD must also notify the driver when it cannot meet the performance requirements specified in this section. At each instance when the ELD cannot establish a link to the engine ECM:

  1) The ELD must notify the driver that it cannot monitor the engine's power status and vehicle's motion status, and cannot capture required data elements from the engine ECM.

  2) The ELD must prompt the driver to acknowledge and confirm that a limited connectivity to the engine ECM may affect his compliance to HOS regulations.

  3) The connectivity status must be indicated to all drivers who may use that ELD. The ELD must provide a recognizable visual indicator, and may provide an audible signal, to the driver as to its limited connectivity status.

  4) The ECM connectivity status must be continuously communicated to the driver when the ELD is powered.

4.6.1.3 Timing Compliance Monitoring

The ELD must periodically cross-check its compliance with the requirement specified in section 4.3.1.5 of this Standard with respect to an accurate external UTC source and must record a timing compliance malfunction when it can no longer meet the underlying compliance requirement.

4.6.1.4 Positioning Compliance Monitoring

a) An ELD must continually monitor the availability of valid position measurements meeting the listed accuracy requirements in section 4.3.1.6 of this Standard and must track the distance and elapsed time from the last valid measurement point.

b) ELD records requiring location information must use the last valid position measurement and include the latitude/longitude coordinates and distance traveled, in kilometers, since the last valid position measurement.

c) An ELD must monitor elapsed time during periods when the ELD fails to acquire a valid position measurement within 8 kilometers of the CMV's movement. When such elapsed time exceeds a cumulative 60 minutes over a 24 hour period, the ELD must set and record a positioning compliance malfunction.

d) If a new ELD event must be recorded at an instance when the ELD had failed to acquire a valid position measurement within the most recent elapsed 8 kilometers of driving, but the ELD has not yet set a positioning compliance malfunction, the ELD must record the character "X" in both the latitude and longitude fields, unless location is entered manually by the driver, in which case it must log the character "M" instead. Under the circumstances listed in this paragraph, if the ELD event is due to a change in duty status for the driver, the ELD must prompt the driver to enter location manually in accordance with section 4.3.2.7 of this Standard. If the driver does not enter the location information and the vehicle is in motion, the ELD must record a missing required data element data diagnostic event for the driver.

e) If a new ELD event must be recorded at an instance when the ELD has set a positioning compliance malfunction, the ELD must record the character "E" in both the latitude and longitude fields regardless of whether the driver is prompted and manually enters location information.

4.6.1.5 Data Recording Compliance Monitoring

a) An ELD must monitor its storage capacity and integrity and must detect a data recording compliance malfunction if it can no longer record or retain required events or retrieve recorded logs that are not otherwise catalogued remotely by the motor carrier.

b) An ELD must monitor the completeness of the ELD event record information in relation to the required data elements for each event type and must record a missing data elements data diagnostics event for the driver if any required field is missing at the time of recording.

4.6.1.6   Monitoring Records Logged under the Unidentified Driver Profile

a) When there are ELD records involving driving time logged on an ELD under the unidentified driver profile, the ELD must prompt the driver(s) logging in with a warning indicating the existence of new unassigned driving time.

b) The ELD must provide a mechanism for the driver to review and either acknowledge the assignment of one or more of the unidentified driver records attributable to the driver under the authenticated driver's profile as described in paragraph 4.3.2.8.2 (b)(1) of this Standard or indicate that these records are not attributable to the driver.

c) If more than 30 minutes of driving in a 24-hour period show unidentified driver on the ELD, the ELD must detect and record an unidentified driving records data diagnostic event and the data diagnostic indicator must be turned on for all drivers logged in to that ELD for the current 24-hour period and the following 14 days.

d) An unidentified driving records data diagnostic event can be cleared by the ELD when driving time logged under the unidentified driver profile for the current 24-hour period and the required previous days drops to 15 minutes or less.

4.6.1.7   Data Transfer Compliance Monitoring

a) An ELD must implement in-service monitoring functions to verify that the data transfer mechanism(s) described in section 4.9.1 of this Standard are continuing to function properly. An ELD must verify this functionality at least once every 7 days. These monitoring functions may be automatic or may involve manual steps for a driver.

b) If the monitoring mechanism fails to confirm proper in-service operation of the data transfer mechanism(s), an ELD must record a data transfer data diagnostic event and enter an unconfirmed data transfer mode.

c) After an ELD records a data transfer data diagnostic event, the ELD must increase the frequency of the monitoring function to check at least once every 24-hour period. If the ELD stays in the unconfirmed data transfer mode following the next three consecutive monitoring checks, the ELD must detect a data transfer compliance malfunction.

4.6.1.8   Other Technology-Specific Operational Health Monitoring

In addition to the required monitoring schemes described in sections 4.6.1.1–4.6.1.7 of this Standard, the ELD provider may implement additional, technology-specific malfunction and data diagnostic detection schemes and may use the ELD's malfunction status indicator and data diagnostic status indicator (described in sections 4.6.2.1 and 4.6.3.1) to communicate the ELD's malfunction or non-compliant state to the operator(s) of the ELD.

4.6.2   ELD Malfunction Status Indicator

ELD malfunctions affect the integrity of the device and its compliance; therefore, active malfunctions must be indicated to all drivers who may use that ELD. An ELD must provide a recognizable visual indicator, and may provide an audible signal, to the operator as to its malfunction status.

4.6.2.1 Visual Malfunction Indicator

a) An ELD must display a single visual malfunction indicator for all drivers using the ELD on the ELD's display or on a stand-alone indicator. The visual signal must be visible to the driver when the driver is seated in the normal driving position.

b) The ELD malfunction indicator must be clearly illuminated when there is an active malfunction on the ELD.

c) The malfunction status must be continuously communicated to the driver when the ELD is powered.

4.6.3 ELD Data Diagnostic Status Indicator

ELD data diagnostic status affects only the authenticated user; therefore, an ELD must only indicate the active data diagnostics status applicable to the driver logged into the ELD. An ELD must provide a recognizable visual indicator, and may provide an audible signal, to the driver as to its data diagnostics status.

4.6.3.1 Visual Data Diagnostics Indicator

a) An ELD must display a single visual data diagnostics indicator, apart from the visual malfunction indicator described in section 4.6.2.1 of this Standard, to communicate visually the existence of active data diagnostics events for the applicable driver.

b) The visual signal must be visible to the driver when the driver is seated in the normal driving position.

4.6.4 Driver notifications for HOS limitations

a) If the driver has indicated authorized personal use of the CMV, the ELD must notify the driver when the cumulative distance driven for personal use throughout the 24-hour period exceeds the maximum distance allowed under current HOS regulations.

b) An ELD must be capable of notifying the driver at least 30 minutes in advance of reaching any duty-/driving-hour limitation prescribed in the HOS regulations.

c) An ELD must also clearly indicate which limit the driver is about to reach for the current 24-hour period, work shift or cycle being used.

4.7 Special Purpose ELD Functions

4.7.1 Driver's ELD Volume Control

a) If a driver selects the sleeper-berth state for the driver's record of duty status, and no co-driver has logged into the ELD as on-duty driving, and if the ELD outputs audible signals, the ELD must either:

    (1) Allow the driver to mute the ELD's volume or turn off the ELD's audible output, or

    (2) Automatically mute the ELD's volume or turn off the ELD's audible output.

b) For purposes of this section, if an ELD operates in combination with another device or other hardware or software technology that is not separate from the ELD, the volume controls required herein apply to the combined device or technology.

4.7.2 Driver's Access to Own ELD Records

a) An ELD must provide a mechanism for a driver to obtain a copy of the driver's own ELD records on demand, in either an electronic or printout format compliant with section 4.8.1.3 of this Standard.

b) The process must not require a driver to go through the motor carrier to obtain copies of the driver's own ELD records if driver's records reside on or are accessible directly by the ELD unit used by the driver.

c) If an ELD meets the requirements of this section by making output files available to the driver, it must also provide a utility function for the driver to display the data on a computer.

4.7.3 Privacy Preserving Provision for Use During Personal Uses of a CMV

a) During a period when a driver indicates authorized personal use of CMV, the ELD must:

   (1) Omit recording latitude/longitude coordinates information for all new ELD events.

   (2) Monitor the cumulative distance driven for personal use as specified in section 4.3.1.3 of this Standard.

   (3) Prevent the driver from selecting any event category, except to indicate the end of authorized personal use described in section 4.3.2.2.2 of this Standard.

   (4) Only record authorized personal use events, ELD malfunction and data diagnostic events, as specified in sections 4.5.1.3 and 4.5.1.7 of this Standard.

b) A driver's indication that the CMV is being operated for authorized personal purposes may span more than one CMV ignition on cycle if the driver proactively confirms continuation of the personal use condition prior to placing the vehicle in motion when the ELD prompts the driver at the beginning of the new ignition power on cycle.

4.7.4 Driver's entries in ELD software application

a) If the support system or any software application meets the compliance requirements specified in this Standard, an ELD must provide a means for a driver to record ELD events.

b) If this function is implemented by the ELD, the ELD must also meet the requirements of this section.

c) When using this function, the ELD must allow the driver to select only the following event types, as described in section 7.25 of this Standard:

    (1) Driver's change in duty status (only on-duty or off-duty)

    (2) Driver's certification/re-certification of records

    (3) Driver's login/logout activity

    (4) Off-duty time deferral

    (5) Driver's cycle change

    (6) Additional hours not recorded.

d) The ELD must only allow one category to be selected at any given time and use the latest selection by the driver.

e) When using this function and for each event type listed in this section, the ELD must record the same data elements outlined in section 4.5.1 of this Standard. However, a subset of the required data elements must be omitted in the records, as described in further detail below. When a driver selects any of those event, the ELD must:

    (1) Record the character "X" in both the latitude and longitude fields, unless location is entered manually by the driver, in which case it must log the character "M" instead. Under the circumstances listed in this paragraph, if the ELD event is due to a change in duty status for the driver, the ELD must prompt the driver to enter location manually in accordance with section 4.3.2.7 of this Standard. If the driver does not enter the location information and the vehicle is in motion, the ELD must record a missing required data element data diagnostic event for the driver.

    (2) Omit recording vehicle distance and engine hours fields by leaving them blank.

    (3) Omit recording vehicle information fields by leaving them blank. In this paragraph, vehicle information means the CMV Power Unit Number or licence plate associated with the event record.

4.8 ELD Outputs

4.8.1 Printout or Display

The ELD must be able to generate a compliant report as specified in this section, either as a printout or on a display.

4.8.1.1 Print Paper Requirements

Print paper must be able to accommodate the graph grid specifications as listed in current HOS regulations.

4.8.1.2 Display Requirements

a) This section does not apply if an ELD produces a printout for use at a roadside inspection.

b) An ELD must be designed so that its display may be reasonably viewed by an authorized safety official without entering the commercial motor vehicle. For example, the display may be untethered from its mount or connected in a manner that would allow it to be passed outside of the vehicle for a reasonable distance.

4.8.1.3 Information To Be Shown on the Printout and Display at Roadside

a) The printout and display must show reports for the inspected driver's profile and the unidentified driver profile separately. If there are no unidentified driver records existing on the ELD for the current 24-hour period and for any of the required previous days as per current HOS regulations, an ELD does not need to print or display unidentified driver records for the authorized safety official. Otherwise, both reports must be printed or displayed and provided to the authorized safety official.

b) The printout and display must show the following information for the current 24-hour period and each of the required previous days under current HOS regulations: (Items in < . > are data elements.)

(1) Date: <Date {of Record}>

(2) 24-hour Starting Time, Time Zone Offset from UTC: <24-Hour Period Starting Time>, <Time Zone Offset from UTC>

(3) Start Odometer: <{Beginning of work shift or 24-Hour Period} {Total} Vehicle Distance {for each CMV}>

(4) End Odometer: <{End of work shift or 24-Hour Period} {Total} Vehicle Distance {for each CMV}>

(5) Carrier: <Carrier Name {for each carrier}>

(6) Carrier address: <Home terminal Address {for each carrier}>, <Principal place of business Address {for each carrier}>

(7) Driver Name: <{Driver} Last Name>, <{Driver} First Name>

(8) Driver ID: < ELD username {for the driver}>

(9) Driver Licence Jurisdiction: <{Driver} Driver Licence Issuing Jurisdiction>

(10) Driver Licence Number: <{Driver} Driver Licence Number>

(11) Co-Driver: <{Co-Driver's} Last Name>, <{Co-Driver's} First Name>

(12) Co-Driver ID: <ELD username {for the co-driver}>

(13) Cycle: <{Current} Cycle {for the driver}>

(14) Operating jurisdiction: <{Current} Operating Jurisdiction>

(15) Total hours in work shift:<{Driver's} Total Hours {for current work shift}>

(16) Total on-duty hours in cycle:<{Driver's} Total Hours {logged in on-duty and driving status} {for current cycle}>

(17) Remaining on-duty hours in cycle:<{Driver's} remaining on-duty Hours {for current cycle}>

(18) Current Odometer: <{Current} {Total} Vehicle Distance>

(19) Current Engine Hours: <{Current} {Total} Engine Hours>

(20) Truck Tractor ID: <CMV Power Unit Number or licence plate {for each CMV}>

(21) Trailer ID: <Trailer Unit Number or licence plate {for each trailer}>

(22) Current Location: <{Current} Geo-location>, <{Current} Latitude>**, <{Current} Longitude**>

(23) Geo-location database: <Date {of Geo-location database}>

(24) Unidentified Driving Records: <{Current} Data Diagnostic Event Indicator Status {for "Unidentified driving records data diagnostic" event}>

(25) Exempt Driver Status: <Exempt Driver Configuration {for the Driver}>

(26) Off-duty Time Deferral Status: <Off-duty Time Deferral Status {and Description} {for the Driver}>

(27) Off-duty Time Deferred: <Off-duty Time Deferred {for the Driver}>

(28) ELD Malfunction Indicators: <Malfunction Indicator Status {and Malfunction Description} {for the ELD}>

(29) Driver's Data Diagnostic Status: <Data Diagnostic Event Status {and Diagnostic Description} {for the Driver}>

(30) Date: <Date {of Printout or Display}>

(31) Comment: <Output File Comment>

(32) 24 Hours [Print/Display Graph Grid]
   - Total hours <Total Hours {in working day so far}>;
   - Off duty <Total Hours {logged in Off-duty status}>;
   - Sleeper Berth <Total Hours {logged in Sleeper berth status}>;
   - Driving <Total Hours {logged in Driving status}>;
   - On duty not driving <Total Hours {logged in on-duty not driving status}>; and
   - Distance Today < Total Distance {accumulated for all CMVs operated by the Driver}>.

(33) [For each Change of Duty Status Events]:
   - <Event Sequence ID Number>**;
   - <Event Record Status {and Description}>;
   - <Event Record Origin {and Description}>**;
   - <Event Type {and Description}>;
   - <{Event} Date>;
   - <{Event} Time>;
   - <{Accumulated} Vehicle Distance>;
   - <{Elapsed} Engine Hours>;
   - <Geo-Location>#;
   - <{Event} Latitude>**;
   - <{Event} Longitude>**;
   - <Distance Since Last Valid Coordinates>**;
   - <{Event} Comment/Annotation>;
   - <{Record Edit} Date>**;
   - <{Record Edit } Time>**; and
   - <{Record Edit} Originator>**.

(34) [For Each Change in Driver's Indication of Special Driving Conditions Events]:
   - <Event Sequence ID Number>**;
   - <Event Record Status {and Description}>;
   - <Event Record Origin {and Description}>**;
   - <Event Type {and Description}>;
   - <{Event} Date>;
   - <{Event} Time>;
   - <{Accumulated} Vehicle Distance>;
   - <{Elapsed} Engine Hours>;
   - <{Total } Vehicle Distance>;
   - <Geo-Location>#;
   - <{Event} Latitude>**;
   - <{Event} Longitude>**;
   - <Distance Since Last Valid Coordinates>**;
   - <{Event} Comment/Annotation>;
   - <{Record Edit} Date>**;
   - <{Record Edit } Time>**; and
   - <{Record Edit} Originator>**.

(35) [For Each Driver's Record Certification Events]:
  - <Event Sequence ID Number>**;
  - <Event Type {and Description}>;
  - <{Event} Date>;
  - <{Event} Time>; and
  - <Time Zone Offset from UTC>.

(36) [For Each Malfunctions and Data Diagnostic Events]:
  - <Event Sequence ID Number>**;
  - <Malfunction/Diagnostic Code {and Description}>;
  - <{Event} Date>;
  - <{Event} Time>;
  - <{Total } Vehicle Distance>;
  - <{Total} Engine Hours>; and
  - <{Event} Comment/Annotation>.

(37) [For Each ELD Login/Logout Events]:
  - <Event Sequence ID Number>**;
  - <Event Type {and Description}>;
  - <{Event} Date>;
  - <{Event} Time>;
  - <{Total } Vehicle Distance>;
  - <{Total} Engine Hours>; and
  - <{Event} Comment/Annotation>.

(38) [For Each CMV Engine Power up / Shut Down Events]
  - <Event Sequence ID Number>**;
  - <Event Type {and Description}>;
  - <{Event} Date>;
  - <{Event} Time>;
  - <{Total } Vehicle Distance>;
  - <{Total} Engine Hours>;
  - <Geo-Location>#;
  - <{Event} Latitude>**;
  - <{Event} Longitude>**;
  - <Distance Since Last Valid Coordinates>**; and
  - <{Event} Comment/Annotation>.

(39)   [For Each Off-Duty Time Deferral Events]:
- <Event Sequence ID Number>**;
- <Event Record Status {and Description}>;
- <Event Record Origin {and Description}>**;
- <Event Type {and Description}>;
- <{Event} Date>;
- <{Event} Time>;
- <Off-duty Time Deferral Status {and Description}>;
- <Off-duty Time Deferred>
- <{Event} Comment/Annotation>;
- <{Record Edit} Date>**;
- <{Record Edit } Time>**; and
- <{Record Edit} Originator>**.

(40)   [For Each Change in Driver's Cycle Events]:
- <Event Sequence ID Number>**;
- <Event Record Status {and Description}>;
- <Event Record Origin {and Description}>**;
- <Event Type {and Description}>;
- <{Event} Date>;
- <{Event} Time>;
- <{Current} Cycle {and Description}>;
- <{Event} Comment/Annotation>;
- <{Record Edit} Date>**;
- <{Record Edit } Time>**; and
- <{Record Edit} Originator>**.

(41)   [For Each Change in Operating Jurisdiction Events]:
- <Event Sequence ID Number>**;
- <Event Record Status {and Description}>;
- <Event Record Origin {and Description}>**;
- <Event Type {and Description}>;
- <{Event} Date>;
- <{Event} Time>;
- <Geo-Location>#;
- <{Event} Latitude>**;
- <{Event} Longitude>**;
- <Distance Since Last Valid Coordinates>**;
- <{Current} Operating Jurisdiction {and Description}>;
- <{Event} Comment/Annotation>;
- <{Record Edit} Date>**;
- <{Record Edit } Time>**; and
- <{Record Edit} Originator>**.

(42)   [For each Additional Hours Not Recorded Events]:
- <Event Sequence ID Number>**;
- <Event Record Status {and Description}>;
- <Event Record Origin {and Description}>**;
- <Event Type {and Description}>;
- <{Event} Date>;
- <{Event} Time>;
- <Date {of the 24-hour period}>;
- <{Beginning of workshift} Time>;
- <{End of workshift} Time>;
- <Total Hours {logged in Off-duty status}>;
- <Total Hours {logged in on-duty not driving status}>
- <{Event} Comment/Annotation>;
- <{Record Edit} Date>**;
- <{Record Edit } Time>**; and
- <{Record Edit} Originator>**

"<Geo-location> must be substituted with "<Driver's Location Description>" field for manual entries.

* Printout report must only list up to 10 most recent ELD malfunctions and up to 10 most recent data diagnostics events within the time period for which the report is generated.

c) The printout and display must show a graph-grid consistent with current HOS regulations showing each change of duty status.

(1)   On the printout, the graph-grid for each day's RODS must be at least 15 centimeters by 4 centimeters in size.

d) If the ELD records units of distance in miles, it must provide a means to display the equivalent distance in kilometers.

e) The display must meet the requirements specified in this section under all circumstances. However, the display may also provide an option to simplify the review process. When this option is selected by the driver, a subset of the required data elements can be omitted on the display, as described in further detail below. When a driver selects this option, the ELD must:

(1)   show the graph-grid specified in paragraph (c) of this section;
(2)   show all data elements specified in paragraph (b) of this section, except data elements identified with the character **.

4.8.2   ELD Data File

An ELD must have the capability to generate a consistent secure electronic document (pdf or other format) compliant with the format and data elements specified under section 4.8.1.3 of this Standard.

4.8.2.1   ELD Output File Standard
Section not required.

4.8.2.2   ELD Output File Name Standard
Section not required.

4.9   Data Transfer Capability Requirements

An ELD must be able to present the captured ELD records of a driver in the standard electronic format as described below, and transfer the data file to an authorized safety official, on demand, for inspection purposes.

4.9.1   Data Transfer During Roadside Safety Inspections

a)   On demand during a roadside safety inspection, an ELD must produce ELD records for the current 24-hour period and each day during the required previous days as per current HOS regulations, in electronic format and including all data elements prescribed under section 4.8.1.3 of this Standard.

b)   When a driver uses the single-step driver interface, as described in section 4.3.2.4 of this Standard, to indicate that the ELD compile and transfer the driver's ELD records to authorized safety officials, the ELD must transfer the generated ELD electronic document to the computing environment used by authorized safety officials via the standards referenced in this section. To meet requirements for electronic document transfer at roadside, an ELD must be able to do at least one of the following:

  (1)   Option 1—Telematics transfer method:

   I.   Wireless Web services, and

   II.   Email

  (2)   Option 2—Telematics transfer method:

   I.   Wireless Web services, and

   II.   Email, AND

   III.   Facsimile

  (3)   Option 3—Local transfer method:

   I.   USB2 (incorporated by reference, see section 6), and

   II.   Bluetooth (incorporated by reference, see section 6).

c)   The ELD must provide an ELD record for the current 24-hour period and each day during the required previous days as per current HOS regulations, as described in section 4.8.1.3 either on a display or on a printout.

d)   An ELD must support one of the three transfer methods for roadside data transfer in paragraph (b) of this section, and must certify proper operation of each element under that method.

4.9.2   Motor Carrier Data Reporting

a) An ELD must be capable of retaining copies of electronic ELD records for the prescribed retention period as per HOS regulations, from the date of receipt.

b) An ELD must produce, on demand, an electronic document or a series of electronic documents of ELD records for a subset of its drivers, a subset of its vehicles, and for a subset of the prescribed retention period, and may be either on a printout or in electronic format as specified in section 4.8.1.3 of this Standard.

c) At a minimum, an ELD must be able to transfer the ELD records electronically by one of the following transfer mechanisms:

(1) Web Services, and E-mail or fax; or

(2) USB 2.0 and Bluetooth (both incorporated by reference, see section 6).

4.10   Communications Standards for the Transmittal of Data Files from ELDs

Section not required.

5   ELD REGISTRATION AND CERTIFICATION

Section not required.

6   REFERENCES

a) Bluetooth SIG, Inc. 5209 Lake Washington Blvd. NE., Suite 350, Kirkland, WA 98033, https://www.bluetooth.org/Technical/Specifications/adopted.htm , (425) 691–3535.

(1) Bluetooth SIG, Inc., Specification of the Bluetooth System: Wireless Connections Made Easy, Covered Core Package version 2.1 + EDR, volumes 0 through 4, approved July 26, 2007, IBR in sections 4.9.1 and 4.9.2 of this Standard.

(2) [Reserved]

b) Universal Serial Bus Implementers Forum (USBIF). 3855 SW. 153rd Drive, Beaverton, Oregon 97006, http://www.usb.org , (503) 619–0426.

(1) USB Implementers Forum, Inc., Universal Serial Bus Specification, Revision 2.0, approved April 27, 2000, as revised through April 3, 2015, IBR in sections 4.9.1, 4.9.2, of this Standard.

(2) [Reserved]

c) Canada Centre for Mapping and Earth Observation, Natural Resources Canada, http://www.nrcan.gc.ca, (343) 292-6096

(1) Canadian Geographical Names Data Base (CGNDB). http://www.nrcan.gc.ca/earth-sciences/geography/place-names/data/9245 , IBR in section 4.4.2 and 6 of this Standard.

7 DATA ELEMENTS DICTIONARY

7.1 24-Hour Period Starting Time

Description: This data element refers to the 24-hour period starting time specified by the motor carrier for driver's home terminal.

Purpose: Identifies the bookends of the work day for the driver; makes ELD records consistent with current HOS regulations requirements.

Source: Motor carrier.

Used in: ELD account profile; ELD outputs.

Data Type: Programmed or populated on the ELD during account creation and maintained by the motor carrier to reflect true and accurate information for drivers.

Data Range: 000000 to 235959; first two digits 00 to 23; middle two digits and last two digits 00 to 59.

Data Length: 6 characters.

Data Format: <HHMMSS> Military time format, where ''HH'' refers to hours, ''MM'' refers to minutes, and ''SS'' refers to seconds; designation for start time expressed in time standard in effect at the driver's home terminal.

Disposition: Mandatory.

Examples: [060000], [073000], [180000].

7.2 Carrier Name

Description: This data element refers to the motor carrier's legal name for conducting commercial business.

Purpose: Provides a recognizable identifier about the motor carrier on viewable ELD outputs.

Source: Motor carrier.

Used in: ELD account profile.

Data Type: Programmed on the ELD or entered once during the ELD account creation process.

Data Range: Any alphanumeric combination.

Data Length: Minimum: 4; Maximum: 120 characters.

Data Format: <Carrier Name> as in <CCCC> to <CCCC. . . . . .CCCC>.

Disposition: Mandatory.

Example: [CONSOLIDATED TRUCKLOAD INC.].

7.3 Carrier's USDOT Number

Section not required.

7.4 CMV Power Unit Number

Description: This data element refers to the identifier the motor carrier uses for their CMVs in their normal course of business.

Purpose: Identifies the vehicle a driver operates while a driver's ELD records are recorded; Makes ELD records consistent with current HOS regulations requirements.

Source: Unique CMV identifiers a motor carrier uses in its normal course of business and includes on dispatch documents, or the licence number of the power unit.

Used in: ELD event records; ELD output file.

Data Type: Programmed on the ELD or populated by motor carrier's extended ELD system or entered by the driver.

Data Range: Any alphanumeric combination.

Data Length: Minimum: 1; Maximum: 10 characters.

Data Format: <CMV Power Unit Number> as in <C> to <CCCCCCCCCC>.

Disposition: Mandatory for all CMVs operated while using an ELD.

Examples: [123], [00123], [BLUEKW123], [TX12345].

7.5 CMV VIN

Section not required.

7.6 Comment/Annotation

Description: This is a textual note related to a record, update, or edit capturing the comment or annotation a driver or authorized support personnel may input to the ELD.

Purpose: Provides ability for a driver to offer explanations to records, selections, edits, or entries.

Source: Driver or authorized support personnel.

Used in: ELD events; ELD outputs.

Data Type: Entered by the authenticated user via ELD's interface.

Data Range: Free form text of any alphanumeric combination.

Data Length: 0–60 characters if optionally entered; 4–60 characters if annotation is required and driver is prompted by the ELD.

Data Format: <Comment/Annotation> as in <{blank}> or <C> to <CCC. . . . . CCC>.

Disposition: Optional in general; Mandatory if prompted by ELD.

Examples: [], [Personal Conveyance. Driving to Restaurant in bobtail mode], [Forgot to switch to SB. Correcting here].

7.7 Data Diagnostic Event Indicator Status

Description: This is a Boolean indicator identifying whether the used ELD unit has an active data diagnostic event set for the authenticated driver at the time of event recording.

Purpose: Documents the snapshot of ELD's data diagnostic status for the authenticated driver at the time of an event recording.

Source: ELD internal monitoring functions.

Used in: ELD events; ELD outputs.

Data Type: Internally monitored and managed.

Data Range: 0 (no active data diagnostic events for the driver) or 1 (at least one active data diagnostic event set for the driver).

Data Length: 1 character.

Data Format: <Data Diagnostic Event Indicator Status> as in <C>.

Disposition: Mandatory.

Examples: [0] or [1].

7.8 Date

Description: In combination with the variable ''Time'', this parameter stamps records with a reference in time; even though date and time must be captured in UTC, event records must use date and time converted to the time zone in effect at the driver's home terminal as specified in section 4.4.3.

Purpose: Provides ability to record the instance of recorded events, entries and edits.

Source: ELD's converted time measurement.

Used in: ELD events; ELD outputs.

Data Type: UTC date must be automatically captured by ELD; date in effect at the driver's home terminal must be calculated as specified in section 4.4.3.

Data Range: Any valid date combination expressed in <MMDDYY> format where ''MM'' refers to months, ''DD'' refers to days of the month and ''YY'' refers to the last two digits of the calendar year.

Data Length: 6 characters.

Data Format: <MMDDYY> where <MM> must be between 01 and 12, <DD> must be between 01 and 31, and <YY> must be between 00 and 99.

Disposition: Mandatory.

Examples: [122815], [010114], [061228].

7.9   Distance Since Last Valid Coordinates

Description: Distance in whole kilometers traveled since the last valid latitude, longitude pair the ELD measured with the required accuracy.

Purpose: Provides ability to keep track of location for recorded events in cases of temporary position measurement outage.

Source: ELD internal calculations.

Used in: ELD events; ELD outputs.

Data Type: Kept track of by the ELD based on position measurement validity.

Data Range: An integer value between 0 and 9; If the distance traveled since the last valid coordinate measurement exceeds 9 kilometers; the ELD must enter the value as 9.

Data Length: 1 character.

Data Format: <Distance Since Last Valid Coordinates> as in <C>.

Disposition: Mandatory.

Examples: [0], [1], [5], [6].

7.10   Driver's Licence Issuing Jurisdiction

Description: This data element refers to the issuing State, Province or Territory of the listed Driver's Licence for the ELD account holder.

Purpose: In combination with ''Driver's Licence Number'', it links the ELD driver account holder uniquely to an individual with driving credentials; ensures that only one driver account can be created per individual.

Source: Driver's licence.

Used in: ELD account profile(s); ELD output file.

Data Type: Entered (during the creation of a new ELD account).

Data Range: To character abbreviation listed on Table 5 of this Standard.

Data Length: 2 characters.

Data Format: <Driver's Licence Issuing Jurisdiction> as in <CC>.

Disposition: Mandatory for all driver accounts created on the ELD; optional for ''non-driver'' accounts.

Examples: [QC], [ON], [MB].

Table 5	
State, Province and Territory Abbreviation Codes	
CANADA	
PROVINCE CODE	PROVINCE
AB	Alberta
BC	British Columbia
MB	Manitoba
NB	New Brunswick
NL	Newfoundland and Labrador
NS	Nova Scotia
NT	Northwest Territories
NU	Nunavut
ON	Ontario
PE	Prince Edward Island
QC	Quebec
SK	Saskatchewan
YT	Yukon

Table 5

State and Province Abbreviation Codes

U.S.A.

State Code	State	State Code	State
AK	Alaska	MT	Montana
AL	Alabama	NC	North Carolina
AR	Arkansas	ND	North Dakota
AZ	Arizona	NE	Nebraska
CA	California	NH	New Hampshire
CO	Colorado	NJ	New Jersey
CT	Connecticut	NM	New Mexico
DC	DIST of COL	NV	Nevada
DE	Delaware	NY	New York
FL	Florida	OH	Ohio
GA	Georgia	OK	Oklahoma
HI	Hawaii	OR	Oregon
IA	Iowa	PA	Pennsylvania
ID	Idaho	RI	Rhode Island
IL	Illinois	SC	South Carolina
IN	Indiana	SD	South Dakota
KS	Kansas	TN	Tennessee
KY	Kentucky	TX	Texas
LA	Louisiana	UT	Utah
MA	Massachusetts	VA	Virginia
MD	Maryland	VT	Vermont
ME	Maine	WA	Washington
MI	Michigan	WI	Wisconsin
MN	Minnesota	WV	West Virginia
MO	Missouri	WY	Wyoming
MS	Mississippi		

AMERICAN POSSESSIONS OR PROTECTORATES

State Code	State
AS	American Samoa
GU	Guam
MP	Northern Mariana Islands
PR	Puerto Rico
VI	Virgin Islands

7.11 Driver's Licence Number

Description: This data element refers to the unique Driver's Licence information required for each driver account on the ELD.

Purpose: In combination with driver's licence issuing jurisdiction, it links the ELD driver account holder to an individual with driving credentials; ensures that only one driver account can be created per individual.

Source: Driver's licence.

Used in: ELD account profile(s); ELD output file.

Data Type: Entered (during the creation of a new ELD account).

Data Range: Any alphanumeric combination.

Data Length: Minimum: 1; Maximum: 20 characters.

Data Format: <Driver's Licence Number> as in <C> to <CCCCCCCCCCCCCCCCCCCC>.For ELD record keeping purposes, ELD must only retain characters in a Driver's Licence Number entered during an account creation process that are a number between 0–9 or a character between A–Z (non-case sensitive).

Disposition: Mandatory for all driver accounts created on the ELD; optional for ''non-driver'' accounts.

Examples: [SAMPLMJ065LD], [D000368210361], [198], [N02632676353666].

7.12 Driver's Location Description

Description: This is a textual note related to the location of the CMV input by the driver upon ELD's prompt.

Purpose: Provides ability for a driver to enter location information related to entry of missing records; provides ability to accommodate temporary positioning service interruptions or outage without setting positioning malfunctions.

Source: Driver, only when prompted by the ELD.

Used in: ELD events; ELD outputs.

Data Type: Entered by the authenticated driver when ELD solicits this information as specified in section 4.3.2.7.

Data Range: Free form text of any alphanumeric combination.

Data Length: 5–60 characters.

Data Format: <CCCCC> to <CCC……CCC>.

Disposition: Mandatory when prompted by ELD.

Examples: [], [5 miles SW of Indianapolis, IN], [Reston, VA].

7.13 ELD Account Type

Description: An indicator designating whether an ELD account is a driver account or support personnel (non-driver) account.

Purpose: Enables authorized safety officials to verify account type specific requirements set forth in this document.

Source: ELD designated.

Used in: ELD outputs.

Data Type: Specified during the account creation process and recorded on ELD.

Data Range: Character ''D'', indicating account type ''Driver'', or ''S'', indicating account type ''motor carrier's support personnel'' (i.e. non-driver); ''Unidentified Driver'' account must be designated with type ''D''.

Data Length: 1 character.

Data Format: <C>.

Disposition: Mandatory.

Examples: [D], [S].

7.14 ELD Authentication Value

Section not required.

7.15 ELD Identifier

Section not required.

7.16 ELD Provider

Section not required.

7.17 ELD Registration ID

Section not required.

7.18 ELD Username

Description: This data element refers to the unique user identifier assigned to the account holder on the ELD to authenticate the corresponding individual during an ELD login process; the individual may be a driver or a motor carrier's support personnel.

Purpose: Documents the user identifier assigned to the driver linked to the ELD account.

Source: Assigned by the motor carrier during the creation of a new ELD account.

Used in: ELD account profile; event records; ELD login process.

Data Type: Entered (during account creation and user authentication).

Data Range: Any alphanumeric combination.

Data Length: Minimum: 4; Maximum: 60 characters.

Data Format: <ELD Username> as in <CCCC> to <CCCC……CCCC>.

Disposition: Mandatory for all accounts created on the ELD.

Examples: [smithj], [100384], [sj2345], [john.smith].

7.19 Engine Hours

Description: This data element refers to the time the CMV's engine is powered in decimal hours with 0.1 hr (6-minute) resolution; this parameter is a placeholder for <{Total} Engine Hours>, which refers to the aggregated time of a vehicle's engine's operation since its inception, and used in recording ''engine power on'' and ''engine shut down'' events, and also for <{Elapsed} Engine Hours>, which refers to the elapsed time in the engine's operation in the given ignition power on cycle, and used in the recording of all other events.

Purpose: Provides ability to identify gaps in the operation of a CMV, when the vehicle's engine may be powered but the ELD may not; provides ability to cross check integrity of recorded data elements in events and prevent gaps in the recording of ELD.

Source: ELD measurement or sensing.

Used in: ELD events; ELD outputs.

Data Type: Acquired from the engine ECM or a comparable other source as allowed in section 4.3.1.4.

Data Range: For <{Total} Engine Hours>, range is between 0.0 and 99,999.9; for <{Elapsed} Engine Hours>, range is between 0.0 and 99.9.

Data Length: 3–7 characters.

Data Format: <Engine Hours> as in <C.C> to <CCCCC.C>.

Disposition: Mandatory.

Examples: [0.0], [9.9], [346.1], [2891.4].

7.20 Event Code

Description: A dependent attribute on ''Event Type'' parameter that further specifies the nature of the change indicated in ''Event Type''; this parameter indicates the new status after the change.

Purpose: Provides ability to code the specific nature of the change electronically.

Source: ELD internal calculations.

Used in: ELD event records; ELD outputs.

Data Type: ELD recorded and maintained event attribute in accordance with the type of event and nature of the new status being recorded.

Data Range: Dependent on the ''Event Type'' as indicated on Table 6 of this Standard.

Data Length: 2 characters.

Data Format: <Event Type> as in <CC>.

Disposition: Mandatory.

Examples: [0], [1], [4], [22].

7.20 Event Code (cont'd)

Event Type	Event Code	Event Code Description
		Table 6
		"Event Type" Parameter Coding
1	1	Driver's duty status changed to "Off-Duty"
1	2	Driver's duty status changed to "Sleeper Berth"
1	3	Driver's duty status changed to "Driving"
1	4	Driver's duty status changed to "On-duty not driving"
2	1	Intermediate log with conventional location precision
2	2	Intermediate log with reduced location precision
3	1	Driver indicates "Authorized Personal Use of CMV"
3	2	Driver indicates "Yard Moves"
3	0	Driver indication for PC, YM and WT cleared
4	1	Driver's first certification of a daily log
4	n	Driver's n'th certification of a daily log (when recertification necessary). "n" is an integer between 1 and 9. If more than 9 certifications needed, use 9 for each new re-certification record.
5	1	Authenticaded driver's ELD login activity
5	2	Authenticaded driver's ELD logout activity
6	1	Engine power-up with conventional location precision
6	2	Engine power-up with reduced location precision
6	3	Engine shut down with conventional location precision
6	4	Engine shut down with reduced location precision
7	1	An ELD malfunction logged
7	2	An ELD malfunction cleared
7	3	An data diagnostic event logged
7	4	An data diagnostic event cleared
20	0	Off-duty time deferral set to "none"
20	1	Off-duty time deferral set to "Day 1"
20	2	Off-duty time deferral set to "Day 2"
21	1	Cycle set to "Cycle 1"
21	2	Cycle set to "Cycle 2"
22	1	Operating jurisdiction set to "south of latitude 60°N in Canada"
22	2	Operating jurisdiction set to "north of latitude 60°N in Canada"
22	3	Operating jurisdiction set to "United States"
23	1	Additional hours not recorded

7.21   Event Data Check Value

Section not required.

7.22   Event Record Origin

Description: An attribute for the event record indicating whether it is automatically recorded, or edited, entered or accepted by the driver, requested by another authenticated user, or assumed from unidentified driver profile.

Purpose: Provides ability to track origin of the records.

Source: ELD internal calculations.

Used in: ELD event records; ELD outputs.

Data Type: ELD recorded and maintained event attribute in accordance with the procedures outlined in sections 4.4.4.2.2, 4.4.4.2.3, 4.4.4.2.4, 4.4.4.2.5, and 4.4.4.2.6 of this Standard.

Data Range: 1, 2, 3 or 4 as described on Table 7 of this Standard.

Data Length: 1 character.

Data Format: <Event Record Origin> as in <C>.

Disposition: Mandatory.

Examples: [1], [2], [3], [4].

Table 7	
"Event Record Origin" Parameter Coding	
Event Record Origin	**Event Record Origin Code**
Automatically recorded by ELD	1
Edited or entered by the Driver	2
Edit requested by an Authenticated User other than the Driver	3
Assumed from Unidentified Driver profile	4

7.23 Event Record Status

Description: An attribute for the event record indicating whether an event is active or inactive and further, if inactive, whether it is due to a change or lack of confirmation by the driver or due to a driver's rejection of change request.

Purpose: Provides ability to keep track of edits and entries performed over ELD records while retaining original records.

Source: ELD internal calculations.

Used in: ELD event records; ELD outputs.

Data Type: ELD recorded and maintained event attribute in accordance with the procedures outlined in sections 4.4.4.2.2, 4.4.4.2.3, 4.4.4.2.4, 4.4.4.2.5, and 4.4.4.2.6 of this Standard.

Data Range: 1, 2, 3 or 4 as described on Table 8 of this Standard.

Data Length: 1 character.

Data Format: <Event Record Status> as in <C>.

Disposition: Mandatory.

Examples: [1], [2], [3], [4].

Table 8	
"Event Record Status" Parameter Coding	
Event Record Status	**Event Record Status Code**
Active	1
Inactive - Changed	2
Inactive - Change Requested	3
Inactive - Change Rejected	4

7.24 Event Sequence ID Number

Description: This data element refers to the serial identifier assigned to each required ELD event as described in section 4.5.1 of this Standard.

Purpose: Provides ability to keep a continuous record, on a given ELD, across all users of that ELD.

Source: ELD internal calculations.

Used in: ELD event records; ELD outputs.

Data Type: ELD maintained; incremented by 1 for each new record on the ELD; continuous for each new event the ELD records regardless of owner of the records.

Data Range: 0 to FFFF; initial factory value must be 0; after FFFF hexadecimal (decimal 65535), the next Event Sequence ID number must be 0.

Data Length: 1–4 characters.

Data Format: <Event Sequence ID Number> as in <C> to <CCCC>.

Disposition: Mandatory.

Examples: [1], [1F2C], p2D3], [BB], [FFFE].

7.25 Event Type

Description: An attribute specifying the type of the event record.

Purpose: Provides ability to code the type of the recorded event in electronic format.

Source: ELD internal calculations.

Used in: ELD event records; ELD outputs.

Data Type: ELD recorded and maintained event attribute in accordance with the type of event being recorded.

Data Range: 1–23 as described on Table 9 of this Standard.

Data Length: 2 characters.

Data Format: <Event Type> as in <CC>.

Disposition: Mandatory.

Examples: [1], [5], [4], [22].

Table 9 "Event Type" Parameter Coding	
Event Type	Event Type Code
A change in driver's duty status	1
An intermediate log	2
A change in driver's indication of authorized personal use of CMV or yard moves	3
A driver's certification/re-certification of records	4
A driver's login/logout activity	5
CMV's engine power up/shut down activity	6
A malfunction or data diagnostic detection occurrence	7
Off-duty time deferral	20
A cycle change	21
An change in operating jurisdiction	22
Additional hours not recorded	23

7.26 Exempt Driver Configuration

Description: A parameter indicating whether the motor carrier configured a driver's profile to claim exemption from ELD use.

Purpose: Provides ability to code the motor carrier-indicated exemption for the driver electronically.

Source: Motor carrier's configuration for a given driver.

Used in: ELD outputs.

Data Type: Motor carrier configured and maintained parameter in accordance with the qualification requirements.

Data Range: E (exempt) or 0 (number zero).

Data Length: 1 character.

Data Format: <Exempt Driver Configuration> as in <C>.

Disposition: Mandatory.

Examples: [E], [0].

7.27   File Data Check Value

Section not required.

7.28   First Name

Description: This data element refers to the given name of the individual holding an ELD account.

Purpose: Links an individual to the associated ELD account.

Source: Driver's licence for driver accounts; driver's licence or government issued ID for support personnel accounts.

Used in: ELD account profile(s); ELD outputs (display and file).

Data Type: Entered (during the creation of a new ELD account).

Data Range: Any alphanumeric combination.

Data Length: Minimum: 2; Maximum: 30 characters.

Data Format: <First Name> as in <CC> to <CC......CC> where ''C'' denotes a character.

Disposition: Mandatory for all accounts created on the ELD.

Example: [John].

7.29   Geo-Location

Description: A descriptive indicator of the CMV position in terms of a distance and direction to a recognizable location derived from a database that contains all locations (cities, towns, villages, municipalities, etc.) listed in the latest database provided by the ELD Registration Authority.

Purpose: Provides recognizable location information on a display or printout to users of the ELD.

Source: ELD internal calculations as specified in section 4.4.2 of this Standard.

Used in: ELD display or printout.

Data Type: Identified from the underlying latitude/longitude coordinates by the ELD.

Data Range: Contains four segments in one text field; a recognizable location driven from a database containing—at a minimum— all locations (listed in the database provided by the ELD Registration Authority) in text format containing a location name and the province, territory or state abbreviation, distance from this location and direction from this location.

Data Length: Minimum: 5; Maximum: 60 characters.

Data Format: <Distance from {identified} Geo-location> <'km '> <Direction from {identified} Geo-location> <' '> <Place name of {identified} Geo-location> <' '> < province, territory or State Abbreviation {of identified} Geo Location> where:

<Distance from {identified} Geo-location> must either be <{blank}> or <C> or <CC> where the up-to two character number specifies absolute distance between identified geo-location and event location;

<Direction from {identified} Geo-location> must either be <{blank}> or <C> or <CC> or <CCC>, must represent direction of event location with respect to the identified geo-location, and must take a value listed on Table 10 of this Standard; <Place name of {identified} Geo-location> must be the text description of the identified reference location; < province, territory or State Abbreviation {of identified} Geo Location> must take values listed on Table 5;

Overall length of the ''Geo-location'' parameter must not be longer than 60 characters long.

Disposition: Mandatory.

Examples: [2km ESE Toronto ON], [1km SE Montreal QC], [11km NNW Vancouver BC].

Table 10

Conventional Compass Rose Direction Coding To Be Used in the Geo-Location Parameter.

Direction	Direction Code
At indicated geo-location	{blank}
North of indicated geo-location	N
North – North East of indicated geo-location	NNE
North East of indicated geo-location	NE
East – North East of indicated geo-location	ENE
East of indicated geo-location	E
East – South East of indicated geo-location	ESE
South East of indicated geo-location	SE
South – South East of indicated geo-location	SSE
South of indicated geo-location	S
South – South West of indicated geo-location	SSW
South West of indicated geo-location	SW
West – South West of indicated geo-location	WSW
West of indicated geo-location	W
West – North West of indicated geo-location	WNW
North West of indicated geo-location	NW
North– North West of indicated geo-location	NNW

7.30 Last Name

Description: This data element refers to the last name of the individual holding an ELD account.

Purpose: Links an individual to the associated ELD account.

Source: Driver's licence for driver accounts; driver's licence or government issued ID for support personnel accounts.

Used in: ELD account profile(s); ELD outputs (display and file).

Data Type: Entered (during the creation of a new ELD account).

Data Range: Any alphanumeric combination.

Data Length: Minimum: 2; Maximum: 30 characters.

Data Format: <Last Name> as in <CC> to <CC…..CC>.

Disposition: Mandatory for all accounts created on the ELD.

Example: [Smith].

7.31 Latitude

Description: An angular distance in degrees north and south of the equator.

Purpose: In combination with the variable ''Longitude'', this parameter stamps records requiring a position attribute with a reference point on the face of the earth.

Source: ELD's position measurement.

Used in: ELD events; ELD outputs.

Data Type: Latitude and Longitude must be automatically captured by the ELD.

Data Range: ¥90.00 to 90.00 in decimal degrees (two decimal point resolution) in records using conventional positioning precision; ¥90.0 to 90.0 in decimal degrees (single decimal point resolution) in records using reduced positioning precision when allowed; latitudes north of the equator must be specified by the absence of a minus sign (¥) preceding the digits designating degrees; latitudes south of the Equator must be designated by a minus sign (¥) preceding the digits designating degrees.

Data Length: 3 to 6 characters.

Data Format: First character: [<'¥'> or <{blank}>]; then [<C> or <CC>]; then <'.'>; then [<C> or <CC>].

Disposition: Mandatory.

Examples: [¥15.68], [38.89], [5.07], [¥6.11], [¥15.7], [38.9], [5.1], [¥6.1].

7.32 Line Data Check Value

Section not required.

7.33 Longitude

Description: An angular distance in degrees measured on a circle of reference with respect to the zero (or prime) meridian; the prime meridian runs through Greenwich, England.

Purpose: In combination with the variable ''Latitude'', this parameter stamps records requiring a position attribute with a reference point on the face of the earth.

Source: ELD's position measurement.

Used in: ELD events; ELD outputs.

Data Type: Latitude and Longitude must be automatically captured by the ELD.

Data Range: ¥179.99 to 180.00 in decimal degrees (two decimal point resolution) in records using conventional positioning precision; ¥179.9 to 180.0 in decimal degrees (single decimal point resolution) in records using reduced positioning precision when allowed; longitudes east of the prime meridian must be specified by the absence of a minus sign (¥) preceding the digits designating degrees of longitude; longitudes west of the prime meridian must be designated by minus sign (¥) preceding the digits designating degrees.

Data Length: 3 to 7 characters.

Data Format: First character: [<'¥'> or <{blank}>]; then [<C>, <CC> or <CCC>]; then <'.'>; then [<C> or <CC>].

Disposition: Mandatory.

Examples: [¥157.81], [¥77.03], [9.05], [¥0.15], [¥157.8], [¥77.0], [9.1], [¥0.2].

7.34 Malfunction/Diagnostic Code

Description: A code that further specifies the underlying malfunction or data diagnostic event.

Purpose: Enables coding the type of malfunction and data diagnostic event to cover the standardized set in Table 4 of this Standard.

Source: ELD internal monitoring.

Used in: ELD events; ELD outputs.

Data Type: Recorded by ELD when malfunctions and data diagnostic events are set or reset.

Data Range: As specified in Table 4 of this Standard.

Data Length: 1 character.

Data Format: <C>.

Disposition: Mandatory.

Examples: [1], [5], [P], [L].

Table 4	
Standard Coding for Required Compliance Malfunction and Data Diagnostic Event Detection	
Malfunction/Diagnostic Code	**Description**
P	Power compliance malfunction
E	Engine synchronization compliance malfunction
T	Timing compliance malfunction
L	Positioning compliance malfunction
R	Data recording compliance malfunction
S	Data transfer compliance malfunction
O	Other ELD detected malfunction
1	Power data diagnostic event
2	Engine synchronization data diagnostic event
3	Missing required data elements data diagnostic event
4	Data transfer data diagnostic event
5	Unidentified driving records data diagnostic event
6	Other ELD identified diagnostic event

7.35 Malfunction Indicator Status

Description: This is a Boolean indicator identifying whether the used ELD unit has an active malfunction set at the time of event recording.

Purpose: Documents the snapshot of ELD's malfunction status at the time of an event recording.

Source: ELD internal monitoring functions.

Used in: ELD events; ELD outputs.

Data Type: Internally monitored and managed.

Data Range: 0 (no active malfunction) or 1 (at least one active malfunction).

Data Length: 1 character.

Data Format: <Malfunction Indicator Status> as in <C>.

Disposition: Mandatory.

Examples: [0] or [1].

7.36 Multiday Basis or Cycle Used

Description: This data element refers to cycle 1 (7 days) or cycle 2 (14 days) used to compute cumulative duty hours.

Purpose: Provides ability to apply the HOS rules accordingly.

Source: Motor carrier or driver.

Used in: ELD account profile; ELD outputs, ELD events.

Data Type: Entered by the motor carrier during account creation process or selected by the driver.

Data Range: 7 or 14

Data Length: 2 characters.

Data Format: <Cycle used> as in <CC>.

Disposition: Mandatory.

Examples: [7], [14].

7.37 Order Number

Section not required.

7.38 Output File Comment

Description: A textual field that may be populated with information pertaining to the created ELD output file; an authorized safety official may provide a key phrase or code to be included in the output file comment, which may be used to link the requested data to an inspection, inquiry, or other enforcement action; if provided to the driver by an authorized safety official, it must be entered into the ELD and included in the exchanged dataset as specified.

Purpose: The output file comment field provides an ability to link submitted data to an inspection, inquiry, or other enforcement action, if deemed necessary; further, it may also link a dataset to a vehicle, driver, carrier, and/or ELD that may participate in voluntary future programs that may involve exchange of ELD data.

Source: Enforcement personnel or driver or motor carrier.

Used in: ELD outputs.

Data Type: If provided, output file comment is entered or appended to the ELD dataset prior to submission of ELD data to enforcement.

Data Range: Blank or any alphanumeric combination specified and provided by an authorized safety official.

Data Length: 0–60 characters.

Data Format: <{blank}>, or <C> thru <CCCC……CCCC>.

Disposition: Mandatory.

Examples: [], [3BHG701015], [113G1EFW02], [7353930].

7.39 Shipping Document Number

Section not required.

7.40 Time

Description: In combination with the variable ''Date'', this parameter stamps records with a reference in time; even though date and time must be captured in UTC, event records must use date and time converted to the time zone in effect at the driver's home terminal as specified in section 4.4.3 of this Standard.

Purpose: Provides ability to record the instance of recorded events, entries and edits.

Source: ELD's converted time measurement.

Used in: ELD events; ELD outputs.

Data Type: UTC time must be automatically captured by ELD; time in effect at the driver's home terminal must be calculated as specified in section 4.4.3 of this Standard.

Data Range: Any valid date combination expressed in <HHMMSS> format where ''HH'' refers to hours of the day, ''MM'' refers to minutes, and ''SS'' refers to seconds.

Data Length: 6 characters.

Data Format: <HHMMSS> where <HH> must be between 00 and 23, <MM> and <SS> must be between 00 and 59.

Disposition: Mandatory.

Examples: {070111}, {001259}, {151522}, {230945}.

7.41 Time Zone Offset from UTC

Description: This data element refers to the offset in time between UTC time and the time standard in effect at the driver's home terminal.

Purpose: Establishes the ability to link records stamped with local time to a universal reference.

Source: Calculated from measured variable <{UTC} Time> and <{Time Standard in Effect at driver's home terminal} Time>; Maintained together with ''24-hour Period Starting Time'' parameter by the motor carrier or tracked automatically by ELD.

Used in: ELD account profile; ELD event: Driver's certification of own records.

Data Type: Programmed or populated on the ELD during account creation and maintained by the motor carrier or ELD to reflect true and accurate information for drivers. This parameter must adjust for Daylight Saving Time changes in effect at the driver's home terminal.

Data Range: 04 to 11; omit sign.

Data Length: 2 characters.

Data Format: <Time Zone Offset from UTC> as in <HH> where ''HH'' refer to hours in difference.

Disposition: Mandatory.

Examples: {04}, {05}, {10}.

7.42 Trailer Number(s)

Description: This data element refers to the identifier(s) the motor carrier uses for the trailers in their normal course of business.

Purpose: Identifies the trailer(s) a driver operates while a driver's ELD records are recorded; makes ELD records consistent with current HOS regulations requirements.

Source: Unique trailer identifiers a motor carrier uses in their normal course of business and includes on dispatch documents, or the licence number of each towed unit; trailer number(s) must be updated each time hauled trailers change.

Data Type: Automatically captured by the ELD or populated by motor carrier's extended ELD system or entered by the driver; must be updated each time the hauled trailer(s) change.

Data Range: Any alphanumeric combination.

Data Length: Minimum: blank; Maximum: 32 characters (3 trailer numbers each maximum 10 characters long, separated by spaces).

Data Format: Trailer numbers; separated by space in case of multiple trailers hauled at one time; field to be left ''blank'' for noncombination vehicles (such as a straight truck or bobtail tractor).

<Trailer Unit Number {#1}><' '><Trailer Unit Number {#2}> <' '><Trailer Unit Number {#3}> as in <{blank}> to <CCCCCCCCCC CCCCCCCCCCCCCCCCCCCC>.

Disposition: Mandatory when operating combination vehicles.

Exemples: {987}, {00987 PP2345}, {BX987 POP712 10567}, {TX12345 LA22A21}.

7.43 Vehicle Distance

Description: This data element refers to the distance traveled using the CMV in whole kilometers; this parameter is a placeholder for <{Total} Vehicle Distance>, which refers to the odometer reading and is used in recording <{Accumulated} Vehicle Distance>, which refers to the accumulated distance in the given ignition power on cycle and is used in the recording of all other events.

Purpose: Provides ability to track distance traveled while operating the CMV in each duty status. Total distance traveled within a 24-hour period is a required field in current HOS regulations.

Source: ELD measurement or sensing.

Used in: ELD events; ELD outputs.

Data Type: Acquired from the engine ECM or a comparable other source as allowed in section 4.3.1.3.

Data Range: For <{Total} Vehicle Distance >, range is between 0 and 9,999,999; for <{Accumulated} Vehicle Distance >, range is between 0 and 9,999.

Data Length: 1–7 characters.

Data Format: <Vehicle Distance > as in <C> to <CCCCCCC>.

Disposition: Mandatory.

Examples: [99], [1004566], [0], [422].

7.44 Off-Duty Time Deferral Status

Description: This data element states that the driver is deferring off-duty time and clearly indicates whether the driver is driving under day one or day two of that time.

Purpose: Identifies the "day one" or "day two" of the work day for the driver; makes ELD records consistent with current HOS regulations requirements.

Source: driver.

Used in: ELD events; ELD outputs.

Data Type: ELD internal.

Data Range: 0 (none) or 1 (day one) or 2 (day two).

Data Length: 1 character.

Data Format: < Off-Duty Time Deferral Status> as in <C>.

Disposition: Mandatory.

Examples: [0], [1], [2].

7.45 Off-Duty Time Deferred

Description: This data element refers to the off-duty time deferred by the driver.

Purpose: Identifies the off-duty time deferred from "day one" to "day two" by the driver; makes ELD records consistent with current HOS regulations requirements.

Source: driver, only when prompted by the ELD.

Used in: ELD events; ELD outputs.

Data Type: entered by the driver.

Data Range: Any time allowed under current HOS regulations, and expressed in <HHMM> format where ''HH'' refers to hours and ''MM'' refers to minutes.

Data Length: 4 characters.

Data Format: <HHMM> where <HH> must be between 00 and 02, <MM> must be between 00 and 59.

Disposition: Mandatory.

Examples: [0030], [0130], [0200].

7.46 Operating Jurisdiction

Description: This data element refers to the operating jurisdiction (south or north of latitude 60°N) used to compute cumulative duty hours.

Purpose: Provides ability to apply the HOS rules accordingly.

Source: populated by motor carrier's extended ELD system or entered by the driver.

Used in: ELD outputs, ELD events.

Data Type: Entered by the motor carrier during account creation process or entered by the driver.

Data Range: 1 (south of latitude 60°N in Canada) or 2 (north of latitude 60°N in Canada) or 3 (United States).

Data Length: 1 character.

Data Format: <Operating Jurisdiction> as in <C>.

Disposition: Mandatory.

Examples: [1], [2], [3].

7.47 In-dash Total Vehicle Distance

Section not required.

7.48 Motor Carrier's address

Description: This data element refers to the motor carrier's addresses of the home terminal and the principal place of business.

Purpose: Identifies the address of every motor carrier by whom the driver was employed or otherwise engaged during that day. Makes ELD records consistent with current HOS regulations requirements.

Source: Motor carrier.

Used in: ELD account profile, ELD outputs.

Data Type: Programmed on the ELD or entered once during the ELD account creation process.

Data Range: Any alphanumeric combination.

Data Length: Minimum: 60 characters; Maximum: 120 characters (2 addresses each, either identical or different, separated by spaces).

Data Format: <Home terminal Address> <' '> <Principal place of business Address> as in < CCCC. . . . . .CCCC> and <CCCC. . . . . .CCCC>.

Disposition: Mandatory.

Example: [1234 Industrial St., Montreal, QC, H1C 1M1].